DOCUMENT RESUME

ED 174 422	SE 027 991
TITLE	Biomedical Social Science, Unit I: Health and Society. Basic Social Science Inquiry Into Health-Related Problems. Instructor's Manual. Revised Version, 1975.
INSTITUTION	Biomedical Interdisciplinary Curriculum Project, Berkeley, Calif.
SPONS AGENCY	National Science Foundation, Washington, D.C.
PUB DATE	75
NOTE	150p.; For related documents, see SE 027 978-999 and SE 028 510-516; Not available in hard copy due to copyright restrictions; Contains occasional light type
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Career Education; Environment; *Health; *Health Education; Interdisciplinary Approach; *Lesson Plans; Public Health; Science Education; Secondary Education; *Social Studies; Social Values; *Values

ABSTRACT

This guide presents lesson plans to accompany the lessons presented in the associated student text. The lessons are designed to teach social science concepts that enhance the prospective health care practitioner's ability to interact effectively with people and to anticipate the demands of health care delivery situations. An introduction to the concepts to be taught in this approach is provided. Lesson plans provide: (1) a synopsis; (2) objectives; (3) lists of supplies needed for the lesson; (4) suggested teaching procedures; and (5) discussion and suggestions concerning the assignment associated with the lesson. (RE)

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BIOMEDICAL SOCIAL SCIENCE

UNIT 1

HEALTH AND SOCIETY

BASIC SOCIAL SCIENCE INQUIRY INTO HEALTH-RELATED PROBLEMS

INSTRUCTOR'S MANUAL

BIOMEDICAL SOCIAL SCIENCE

UNIT I

HEALTH AND SOCIETY

Basic Social Science Inquiry into Health-Related Problems

Instructor's Manual
Revised Version, 1975

THE BIOMEDICAL INTERDISCIPLINARY CURRICULUM PROJECT

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INTRODUCTION

Why a Biomedical Social Science course? The answer to this question should be found in the course itself, although some introductory comments are appropriate here. Many health care practitioners interact with patients or clients. In doing so, they often encounter persons who are concerned for their own health, who may be under stress, and who may not know what is expected of them or what they may expect of others in the health care delivery situation. A knowledge of human behavior can be very useful to the health care practitioner as he or she attempts to help such persons. Such knowledge may be equally useful in the practitioner's daily interaction with supervisors, subordinates and fellow workers.

A second and equally important reason for health care practitioners to study social science is that health and illness are closely related to psychological and social processes, both in the immediate environment and in the larger society. Many definitions of good health refer to processes of interaction and adaption between the individual and a changing environment--an environment that includes people and their interactions as well as air and water that may be clean or polluted, food and housing that may be inadequate, etc. Futhermore, decisions about how health care should be allocated within our society are shaped by many social structures and processes; they are often as heavily influenced by considerations of politics and economics as by questions of medical necessity. In short, it is difficult if not impossible for a health care practitioner to understand an individual's health needs without understanding his or her social environment; it is equally difficult for a citizen to understand a society's health care needs without understanding the society.

The Content of the Course:

The Biomedical Social Science course is designed to meet two major educational criteria. First, it must complement the Biomedical Science and Biomedical Mathematics courses by providing opportunities for students to explore social and psychological dimensions of health, disease and health care delivery. Second, it must provide students with a grounding in social science principles at least as thorough as they would receive in ordinary high-school social science courses; to this end, it must have integrity as a social science course, but it is social science with a biomedical perspective.

The Biomedical Social Science course is unique among high-school social science courses on several counts. As has been mentioned, this course emphasizes biomedical examples, and it is designed to be taught in conjunction with a mathematics and a laboratory science course. In addition, this course brings together principles and methods from a variety of social science disciplines. It enables the student to approach a health care problem not from a single perspective but from several perspectives, including the economic, the political, the social, the cultural, the psychological, the ethical and the ecological perspectives. It encourages the student to combine the knowledge that can be gained from these perspectives, along with the knowledge that can be gained from the several perspectives of natural science, to arrive at a holistic understanding of a health problem.

The first unit of the course introduces a representative sample of the content of the rest of the course, asking students to investigate a variety of health-related problems. It also introduces the points of view of the several social science disciplines and illustrates the fact that a given problem can be usefully studied from more than one of these points of view. Finally, the first unit introduces a variety of methods of inquiry used in the social sciences, all of which will develop further in later units.

Two additional units complete the first year of the course. The second unit is a study of several cultures, including preindustrial cultures. This unit is designed not only to introduce concepts and methods of cultural anthropology, but also to equip students to cope--both as health practitioners and as citizens--with the cultural diversity of their own society. The third unit is an introduction to American society in which students are encouraged to assume the viewpoints of several disciplines, including sociology, economics and political science.

The second year follows logically from the first, though either the first or the second year can be taught independently. The second year begins with a consideration of influences that shape the behavior of individuals and groups, primarily from the viewpoints of social psychology and related disciplines. The next unit is an analysis of ways in which resources are allocated in complex societies; the focus is on resources related to health care, and the viewpoints are those of political science and sociology as well as economics. In the final unit students examine questions related to population growth and population control, including the use of genetic technology in shaping the characteristics of individuals and of populations.

Each unit in this Instructor's Manual begins with a Prefatory Note, which provides a more detailed description of the content and the methods used in the particular unit. Each unit is designed so that it can be taught independently, without dependence either on other units of Biomedical Social Science or on concurrent units in Biomedical Science and Mathematics. It is preferable that the units of this course be taught in sequence, since skills and concepts developed in one unit are used in succeeding units. It is also preferable that this course be taught concurrently with the other two Biomedical courses, particularly the Science course, since the content of one course frequently will contribute to the students' understanding of the content of the other. However, with advance preparation and some borrowing of content from other units, any unit in this course can be taught independently.

A Note on Pedagogy and Scheduling:

The intent of this course is to create situations in which students come to be persuaded, through their own investigations, of the accuracy of the content they encounter--and, as a consequence of their experiences in several such situations, to enable students to formulate questions, to design and carry out investigations and to draw their own conclusions. In short, the emphasis is on the process of learning rather than on the content to be learned. Many of the learning experiences in this course--simulations, laboratory experiments, role-playing situations and so on--take place in the classroom, and are designed to enable students to learn skills or concepts from the experiences themselves. Consequently, objectives are not stated in the Student Text, and little didactic information is provided. The Instructor's Manual suggests ways in which you can conduct these learning experiences and occasionally provides background information that you may be able to use when the class is discussing the experience.

It will appear at times that you could save yourself and your students a lot of trouble by simply telling them what it is that they are supposed to be learning, rather than creating situations in which they attempt to learn it for themselves, at their own pace and in their own style. To take such shortcuts is, however, to subvert the purposes of the course. This is true in part because students are more likely to remember what they have experienced than what they have been told, but also, and more importantly, because the course is designed to help you teach students how to learn, not to funnel facts through you to them. The student who emerges from this course as a constructive critic of the objectives and methods of social science will have come closer to success than the student who is able to recall all the facts that have been presented in the course. For the methods of inquiry that the former student has learned are adaptable and will continue to be useful for many years and in many situations; while the facts that the latter student has acquired will become useless as the society changes around him.

Each lesson in this Instructor's Manual includes a section entitled, "Suggested Teaching Procedures." Many lessons include suggestions for more than one way of accomplishing the objectives of the lesson, and most are designed to leave you with considerable flexibility in scheduling activities, imposing requirements for assignments and so on. More importantly, however, all teaching procedures in this Manual are, as they say they are, suggested. We recognize that nobody knows your class as well as you do, and we also recognize that you have developed your own strategies for accomplishing many objectives in the classroom. Any or all of your techniques may be more effective in your classroom than the procedures we suggest for accomplishing the same objectives. We urge you to read these suggestions before deciding how you will present a particular lesson, to rely on them in areas of inquiry with which you may not be familiar, and to rely on your own experience in adapting them to your classroom.

Each lesson in this course is designed so that it can be taught in one day. You may find, however, that a particular lesson requires more than one class period. We encourage you to adapt these lessons to the needs of your class. However, because your students are taking three Biomedical courses, and because there are frequently relationships between these courses, it is important that you share your scheduling decisions with the Biomedical Science and Mathematics teachers. There are very few instances in this curriculum in which two teachers must be teaching the same lesson on the same day. However, there are many instances in which a particular Social Science sequence should be taught at approximately the same time as a particular Science sequence, because the content of one course will help students to understand the content of the other.

Evaluation Possibilites:

No tests are included with this course. Written tests suffer two major faults: they often suggest that knowledge is at a standstill, and they can encourage students to work for successful test results at the expense of reflective inquiry into the content and methods under consideration. We suggest that the emphasis in evaluation, as in instruction, should be on the process of learning rather than on the content to be learned.

There are many opportunities to assess students' progress within the context of the lessons. Written assignments are often suggested, and you will find places in which they are appropriate for your class even though we have not suggested them. You can use written assignments to help students develop writing skills, as well as to assess their understanding of the skills and concepts they are studying. You can also use written assignments for criterion-referenced evaluation. That is, when you return a student's work you can indicate what the student can do to improve the work, and allow the student to submit the work again. To evaluate without allowing for improvement can be very discouraging, and the use of criterion-referenced evaluation does much to eliminate that source of discouragement.

Many other opportunities for you to assess students' progress are included in the teaching procedures suggested for each lesson. When students are asked to formulate generalizations from data they have obtained, the quality of their generalizations will indicate not only the extent to which students are familiar with the data but also the extent to which students are able to perform the mental operations required to formulate a valid generalization from given data. When students are asked to assess the usefulness of a particular method of inquiry for learing about a particular health problem, their responses will indicate not only how much they know about the problem but also how much they know about the method; a student who is able to criticize a method of inquiry or the way in which it has been used in a particular instance may have learned more than the student who can recite a generalized description of the method.

If you wish to design your own evaluation instruments, you will find that the objectives described at the beginning of each lesson describe things that a student should be able to do as a consequence of having studied the lesson. For example, in one sequence in the first unit, students learn (by responding to a questionnaire and then designing, administering and analyzing results from their own questionnaire) what is necessary to produce a useful questionnaire. If, after this sequence, you feel that you need more information about the students' progress, you can set them the task of writing questionnaire items on some subject unrelated to the content of that lesson sequence (which happens to be attitudes and behaviors with respect to health). You can then use students' responses to assess their ability to design a questionnaire that meets the criteria stated in the objectives for that sequence of lessons. At the same time, you will have given students an opportunity to apply what they have learned in a new context, and thus to enhance their ability to use this method of inquiry.

In summary, the more opportunites you provide for students to apply new skills and concepts, either to the content of this course or to other content to which students can generalize, the more comprehensive a view of the students' progress you will obtain. Many teachers find that their own students provide excellent suggestions for ways to evaluate their own progress, and you may wish to incorporate student-initiated methods in your evaluation strategy.

As a final note, we urge you to keep in mind that you are one third of an instructional team. Your students are together for four class periods every day. They will develop a sense of identity that can be used to your and their advantage, or to your and their detriment. At some point during the first year of the Biomedical Curriculum the class will cease to be a collectivity and will become a group, with a "Biomed" identity within the school. If you maintain close contact with the other Biomedical instructors and share ideas on teaching and evaluation, your students will be better able to take advantage of their situation. This may mean giving up a Social Science class so that an extended Science or Mathematics activity can occur; it may mean marking time until the Science teacher has accomplished some activity that should precede a Social Science lesson. When students realize that you and your colleagues are working together to create a better learning environment for them, their own experiences in the Biomedical curriculum will be enriched.

PREFATORY NOTE TO THE INSTRUCTOR

This unit has been designed as an introduction, both for you and for your students, to the Biomedical Social Science course. The materials for the unit introduce a wide range of content areas, all directly related to health, disease and health care. These materials also introduce a variety of methods of inquiry drawn from the social sciences.

Most content areas and all methods of inquiry introduced in this unit will recur in later units, where they can be studied at greater length and in more detail. In this introductory unit, therefore, they can be studied superficially or in depth, as the needs and capabilities of your students dictate. The materials in this unit have been designed to give you the greatest possible amount of flexibility in teaching each of the topics introduced.

This unit includes a large number of suggested writing assignmen which you can use to assess your students' verbal capabilities and to help students improve their writing skills. This Instructor's Manual does not include specific suggestions for that kind of teaching; most writing assignments are open enough to allow you to set your own requirements for length, format and style, and to adapt your own teaching strategies to the verbal capabilities and needs of individua students.

We strongly recommend that both you and your students adopt an exploratory attitude toward this unit. While you are finding out wha your students are capable of and what they are interested in, they will be confronting a variety of ideas, most or all of which will be new to them. If students feel that they are required to "cover" everything in the unit, to master all the skills and concepts and memorize all the vocabulary, then the variety could easily become bewildering or discouraging.

The overriding objective of this unit is to enable the student t approach any human situation--particularly any situation that include a health problem--in several different ways: to look at it from different points of view, to ask different questions about it, to try different ways of finding out the answers. A student who increases his ability to confront human problems in a flexible manner will have succeeded in this unit, regardless of problems he may have had with particular skills and concepts.

Concepts and Skills

The following is an outline of the concepts on which this unit i based and the skills that students may develop. These are presented here under four headings: dimensions of health, levels of analysis, points of view and methods of inquiry. These four categories are described separately and sequentially here, but in the unit itself the are developed concurrently and cumulatively.

A. Dimensions of Health: The rationale for talking about "dimensions of health" is that health problems are often more complicated than most people--including people in health careers--realize.

1. Opinions, Attitudes and Beliefs: The way people think about health and the things they believe about it can be directly instrumental in causing--or preventing--disease. Ignorance is often the cause of disease, and knowledge is often the beginning of a cure.

2. Roles and Relationships: The "roles" involved in health care include all the health careers for which your students are potential candidates, and the "relationships" include all those between doctors and nurses, administrators and workers, professionals and nonprofessionals, specialists in one thing and specialists in another, and so on. Another important role is that of the patient, or client, and another kind of relationship is that which exists between the client and the health workers with whom he is directly or indirectly involved. A particular health problem, or the solution to it, may also involve the client's family members, his employer, his clergyman and so forth.

3. Medical Technology: Health care often includes the use of tools, instruments, drugs and preventive, diagnostic or therapeutic methods which have been found useful in the past. Biomedical Science will introduce your students to many items of medical technology and show what they are for, how they are used and why they work (if anyone knows--they often don't). Biomedical Social Science will, meanwhile, enable students to think about the ways in which their society develops new medical technology and manages the use of existing technology.

4. Disease Causation, Prevention, Detection and Treatment: In Biomedical Science students will study this dimension of many diseases. But this dimension of health is not entirely a matter of anatomy and physiology, genetics and microbiology, chemistry and physics. All diseases are influenced to one degree or another by the psychic and social processes that shape the behavior of the patient.

It will be clear to you that these "dimensions of health" are not mutually exclusive or independent categories. Every health problem, in fact, exists in all these dimensions to some degree. The objective of introducing them as separate dimensions is simply to make the point that every health problem may include any or all of these things, and may therefore be more complex than it at first appears to be.

B. Levels of Analysis: This unit invites students to study health problems on four levels of analysis: the level of the individual, that of the family, that of the community and that of the society. Depending on the nature of the disease, a single health problem may exist on any or all of these levels. Venereal disease, for example, is one kind of problem for an individual, another kind of problem for a family in which one individual has the disease, another kind of problem for a community in which there is an epidemic of the disease and still another kind of problem for a society in which the disease is widespread. Venereal disease, like many other health problems, is really several problems. Trying to solve a health problem on only one level may lead to failure because the same problem also exists on other levels. The ability to think about a health problem--or an economic, political, racial, religious or other human problem--on several levels of analysis, increases the likelihood that the problem will be understood and a solution will be found.

C. Points of View: The "points of view" introduced in this unit roughly correspond to seven academic disciplines or areas of inquiry (discussed separately below). Each discipline, or "point of view," emphasized one or more aspects of human behavior. Adopting a single discipline's point of view in studying a health problem is like looking at a vast panorama through a paper-towel tube: it might help the observer concentrate on one detail, but at the same time it prevents him from seeing the whole view. The standard method of education in this society is, of course, to look at everything through paper-towel tubes, to restrict each course to the viewpoint of a single academic discipline. The Biomedical Social Science course (along with the other two Biomedical courses) enables students to look at health in general, and also at many particular health problems, from several points of view and to combine the knowledge gained from these points of view into an understanding of the whole subject under discussion.

1. Distribution of Resources: This is one of the primary concerns of economists. It is a process that takes place, in different ways, on all levels of analysis, and it is a process that greatly influences health and health care. Examples range from an individual's or family's deciding how much of a limited income can be budgeted for health care, health insurance and the like, to a wealthy society's deciding how much of its resources to devote to medical research, disease prevention, screening and treatment of disease.

2. Allocation of Responsibility: This process is often the object of study for political scientists. It is another process that takes place on several levels of analysis--wherever decisions are made on behalf of groups of people. Exercising authority over the people is a "political" function, but in this society it is not carried out only by governmental agencies. Individuals make many decisions about their own health care for themselves. Other health care decisions are made for people by medical professionals and their professional associations, by hospital and public health administrators, by labor unions and business corporations as well as by elected officials on all levels of government. In a democratically governed society it is up to the citizens to decide who should have how much authority over what, to allocate the responsibility for decision-making.

3. Institutions and Institutional Patterns of Behavior: From the point of view of a sociologist, a society consists of institutions, such as the economy, the polity, the family, education and religion. Each institution, in turn, consists of patterns of behavior by which people are able to interact with one another more or less smoothly and thus to get done what they have to do. This point of view concentrates on one level of analysis, that of society. But it is also useful for studying the behavior and the interactions of individuals--the people whose behavior keeps the institutions going and whose abandoning established patterns of behavior would drastically change those institutions. On any level of analysis, it is often useful to study the way people behave and interact in dealing with (or failing to deal with) a health problem, and their behavior and interactions (as well as one's own) can usually be explained to some extent as institutional patterns of behavior.

4. Shared Ideas and Traditions: Culture, the body of shared ideas and traditions that a people pass down from generation to generation, is within the province of the cultural anthropologist. In a complex society, with roots in many other societies around the world, there is not a single body of shared traditions (though there may be some traditional ideas and practices that most or all members of the society share). There are several bodies of traditions, some of them much different from others. Each of them includes ideas about health and disease, about how to stay healthy and how people get sick, and about what should be done when someone does get sick. It often happens in our own society that a sick person comes from one tradition and the person or persons trying to help him come from another. The consequence of this "cultural barrier" is often misunderstanding and sometimes the failure of health care to help the patient.

5. Thinking, Emotion and Motivation: These are among the concerns of psychologists. From their point of view things are usually studied on the level of the individual or the small group (the family or the peer group, for example). Many health problems are described as abnormalities in thinking or emotion. But even in the absence of "abnormalities," the way people think and the way they feel can sometimes prevent disease, sometimes cause it. A change in thinking or in motivation is often required for successful treatment of disease.

6. Values: Values may be thought of as the specialty of ethical philosophers. In another sense, they are the specialty of every citizen in a democratically governed society; they are the criteria for decision-making, and the responsibility for all decision-making in such a society rests ultimately with the citizens. People who work in health careers have an additional reason to be concerned with values, for they often make decisions that deeply affect the lives of other people. Many of these decisions are very difficult, involving conflict between two or more values--values such as individual freedom, the right of society to protect itself, the right of an individual to live and (if he has such a right) to die.

7. Interaction with Environments: Interactions among organisms, and between organisms and their nonliving environments, are the object of the biological science of ecology. When some of the organisms are human, however, the scale of interaction widens, for humans are the only organisms on the planet that consciously and deliberately change their environments. Many of the changes they make particularly those related to food, housing and sanitation, are beneficial to their health. Others, such as pollution and the crowding of themselves into small spaces, can be harmful. Changing the environment of an individual, a family, a community or even a society may be a way of preventing or treating some health problems.

We remind you again that this unit is not designed to teach students all about all of these "points of view," or even all about some of them. It is designed to alert students to the fact that there are, indeed, at least this many ways of looking at a health problem, and to give them an opportunity to experiment with different points of view in the study of particular problems.

D. Methods of Inquiry: This unit introduces students to ten ways of getting information. Some of them, such as questionnaire surveys and the designing of simulation games, are useful only for learning about human behavior (including attitudes, opinions and beliefs); others, such as book research and data manipulation, are more widely applicable. Most of these methods of inquiry are adapted from methods used in academic social science. All are useful for studying health, disease and health care.

Most of these methods are introduced by means of lessons in which students actually use the methods; one is introduced by a reading, and two are introduced in lessons in which students are the subjects rather than the inquirers. By the end of the unit, however, students will have had opportunities to use all these methods in the attempt to answer questions of their own choosing.

This unit is not primarily intended to teach students how to use all these methods of inquiry. Rather, it is designed to show students that these methods exist; that one method is likely to be more useful than another in a given situation, depending on what one is trying to learn; and that each of these methods presents problems--sometimes ethical problems as well as practical ones. In later units of Biomedial Social Science, students will have opportunities to learn how to use these methods with some skill. In this unit it is important that both you and the students approach these methods with the idea in mind that you and the class are getting acquainted with new things, not trying to master them.

The methods of inquiry are briefly described below. They appear in the order in which they are introduced in the unit.

1. Participant Observation: This method consists of observing the behavior of people in situations in which the observer is normally a part, or into which he or she has managed to become accepted as a participant.

2. Questionnaire Survey: This method is used to get people's responses to specific questions about their opinions, attitudes, beliefs and behavior. The questionnaire is usually administered to a sample drawn from the larger population about which one wants to learn. One problem presented by sampling is the difficulty of ensuring that the sample is representative of the population.

3. Role-Playing: This method is used to explore the thoughts and feelings of other people by "stepping into their shoes" and pretending to be them. For example, males and females can switch roles, the males acting like they think females act and the females acting like they think males act. After the role-players have interacted for a while on this basis, they can revert to their own roles and discuss what they have experienced and what they have perceived.

4. Book Research: This method of research needs no introduction to any American teacher. It may, however, need introducing to some or all of your students. This unit provides several opportunities for its use. Like writing assignments, the book research assignments in this unit are left open enough to allow you to adapt your own teaching strategies and resources to the needs and capabilities of your students.

5. Unstructured Interview: Like the questionnaire survey, this method is used to find out what people have to say. Rather than asking specific questions, however, the inquirer ordinarily asks more general questions and then follows his informant's lead in deciding what specific areas to ask about. An important part of this method is the use of nondirective follow-up, or "probing," questions to encourage the informant to talk about his own concerns.

6. Data Manipulation: Students' first experience with data manipulation in this course is in connection with questionnaire surveys. In a later sequence of lessons, however, students have the opportunity to manipulate data provided by other inquirers. In the latter sequence students concentrate on the usefulness and the limitations of acquiring other people's data, reorganizing them and attempting to draw conclusions from them. In all data-manipulation activities in this unit, students are hampered by lack of the mathematical skills necessary to draw statistically reliable conclusions from data. In this unit, therefore, students concentrate on the qualitative nature of the process of deriving information from numbers; in later units, after statistical methods have been introduced in Biomedical Mathematics, students will be able to build on this basis and to conduct more sophisticated, statistically sound data-based inquiry.

7. Field Manipulation and Observation: This method consists of going into a familiar or unfamiliar situation (the field) and performing some preplanned act (the manipulation), then carefully watching how other people react (the observation). The method is introduced by means of a reading. The method is both technically and ethically questionable (it usually involves some sort of deception), but in the latter part of the unit there are opportunities for students to use the method if you and they think it is a good idea for them to do so.

8. Nonparticipant Observation: This method is much like participant observation, except that the situation in which the inquirer works is one in which he is an outsider, a "nonparticipant." Students are introduced to this method and some of its drawbacks by a classroom situation in which they are the persons being observed by an outsider. They then have opportunities to use the mehtod themselves in later lessons.

9. Laboratory Experiment: This method is somewhat like field manipulation and observation, except that the observation is carried out in a laboratory situation, where variables can be controlled more closely than in field situations. Students are introduced to this method by means of an experiment in the classroom in which most students are subjects, and you and certain selected students are the researchers. Later, students have opportunities to devise laboratory experiments of their own.

10. Model-Building: This is essentially a method of organizing information derived from any method of observation or inquiry, by eliminating information one thinks is extraneous and then describing relationships among the items of information that remain. In this unit students concentrate on working models, or simulations, as opposed to static descriptive models. In social science inquiry, a simulation is a simplified version of a real social process, with rules representing the relationships the designer thinks exist among the participants. Many board games are simulations that more or less accurately reflect real social processes. Examples are the game of Monopoly, which purports to represent a segment of the American economy of the 1920's, and the Asian game of wei-ch'i, or go, which incorporates many essential features of guerilla warfare. Students are introduced to model-building by means of a series of lessons in which they participate in a simulation and then attempt to improve on the simulation as a model of a real social process. Later, students have opportunities to design original simulations.

CONTENT:

Below is a list of the main content areas students will be asked to investigate during this unit. They are described in the order in which they appear in the unit.

A. What Is Health? Students use participant observation and a questionnaire survey to explore the thoughts of people in the community on this question. Lessons introduce students to a wide range of possible ideas of what health is, from "absence of disease" to "complete mental and physical well-being" and "a process of continuous adaptation to environments." The broader definitions emphasize the importance of psychic and social processes as determinants of health and disease.

B. Roles and Relationships in Health Care: Students read a story about a health care delivery situation, then rewrite it from the viewpoints of the several characters in the story. Lessons introduce the idea that it is important to examine a health problem from several points of view.

C. Medical Technology: The class is divided into representatives of the seven "points of view" (distribution of resources, allocation of responsibility, etc.) and then, in a role-playing exercise, interact as "experts" on the problem of controlling the use of medical technology at the level of the society.

D. Health Careers: Students conduct book research on health careers of their own choosing and report on what they have learned. Lessons encourage the student to think and learn about what it would be like for him, as an individual, to prepare for and to work in the career he is studying.

E. Emotional Stress and Physical Symptoms: Students conduct unstructured interviews to determine whether people in the community think emotional stress can cause physical illness. They also use data manipulation to learn about a possible relationship between personality and social characteristics and a particular kind of illness, coronary heart disease. Lessons emphasize the idea that psychic and physical processes--including health and disease--are interrelated.

F. Air Pollution: Students design and conduct their own inquiry into aspects of air pollution which interest them. (The first unit of Biomedical Science includes several activities in which students learn about natural-science aspects of air pollution and its relation to respiratory disease.) Lessons give students the opportunity to use the skills and concepts acquired in earlier lessons.

G. Health and Environments: Students participate in a simulation that purports to be a model of the interaction between families with particular health problems and the environments in which they might live. Lessons encourage students to improve the simulation or design a better one.

H. Community Health Maintenance: Students again have the opportunity to use all the skills and concepts from previous lessons in studying a real problem. Lessons ask students to design, wholly or in parts, a workable health maintenance system for their community, and then to conduct research projects based on their own ideas. (Will it work? Is it necessary? How much would it cost? Would people in the community use it?--and so on.)

Note that two sequences in the latter part of the unit--the one on air pollution and the one on community health maintenance--are designed to allow students to use any and all of the skills and concepts presented in the unit. These sequences are also designed, however, to give you maximum flexibility in guiding the students' inquiry. Depending on your assessment of the students' capabilities, you can use these sequences to give all students narrowly defined and easily completed tasks, to give all students completely open assignments, or to use any mixture of closed and open methods. We recommend that students be given as much freedom as possible in deciding what they will learn and how they will go about learning it.

Note also that the content areas described above are not mutually exclusive. Any student who has taken exceptional interest in an earlier assignment can be allowed to expand, improve or follow up on his work when he gets to later assignments. For example, a student who has taken a deep interest in a particular health career while researching it might be encouraged to concentrate in later lessons on the relationship of that career to later topics, particularly including air pollution and community health maintenance. Similarly, if one student has done unusually good work in one content area but does not want to work in it in later lessons, another student might be allowed, with his permission, to pick up where he left off and pursue the same ideas in relation to later content areas. While it is of course important that a student learn to do his own work, it is perhaps equally important that he learn to make use of the work of others. Very few workers in health careers or in any other field of endeavor start from scratch.

LESSONS REQUIRING ADVANCE PREPARATIONS

Some of the activities suggested for lessons in this unit will require advance preparations on your part. Some of these preparations need to be made only a day or two in advance, but some others should be begun as soon as possible. Below are descriptions of six activities requiring particularly well thought-out preparation. By reading the Suggested Teaching Procedures for all lessons a week or so before you teach the lessons, you will be able to identify other preparations you can make which will help the lessons to function smoothly.

Lessons 12-15: Health Careers: This is the sequence in which students do individual book research on health careers that interest them. There are two kinds of preparations you can do in advance; one is necessary for the success of the activity as described in Suggested Teaching Procedures, and the other is optional.

The more important preparation is the assembling of a library of books and pamphlets on health careers. In the Advance Preparations section immediately preceding the Suggested Teaching Procedures for lessons 12-15 you will find listed two books that contain information on a variety of health careers. In addition, you will find at the end of this Instructor's Manual an Appendix, "Information on Health Careers." This Appendix lists more than one hundred agencies to which you can write for information on health careers and career opportunities.

You should begin assembling a health careers library as soon as possible. The information contained in such a library will be useful to students not only during lessons 12-15, but throughout the time they are enrolled in the Biomedical Curriculum. As graduation draws near, bringing with it the necessity to make educational and career decisions, students will increasingly feel the need for practical, accessible and up-to-date information on health careers.

The other form of preparation for lessons 12-15, which is not essential but which you might consider useful, is to invite guest speakers into your classroom to answer students' questions about a variety of health careers.

For further information and suggestions relating to these preparations, see "Health Careers" and "Questions about Health Careers" in the Student Text; the Advance Preparations and Suggested Teaching Procedures for lessons 12-15; and the Appendix, "Information on Health Careers," at the end of this Instructor's Manual.

Lesson 24: Effects on Subjects of Observing Their Behavior: In this lesson a "nonparticipant observer" visits your classroom during a class meeting, and pretends to be filming or videotaping your students as they discuss the homework assignment from the preceding lesson. The visit should be unexpected by the students. and it should be explained by a cover story which you and the visitor have worked out in advance.

You will find detailed suggestions for setting up the sham filming in the Advance Preparations section immediately preceding the Suggested Teaching Procedures for Lesson 24. You should also read the Suggested Teaching Procedures for the lesson itself before you make arrangements with your visitor.

Lessons 26 and 27: Laboratory Experiment with Human Subjects: At the end of Lesson 25 you administer to your class Section A of a "Test of Ability to Interpret Biomedical Terminology." This is followed, at the beginning of Lesson 26, by Section B of the "Test." During the administration of Section B you will need the assistance of two or three student confederates. The advance preparation required for this experiment is the selection and briefing of students who will serve as confederates.

For detailed suggestions on how to prepare your student confederates, see the Advance Preparations section immediately preceding the Suggested Teaching Procedures for Lessons 26 and 27. You should also read the Suggested Teaching Procedures for this two-lesson sequence before selecting and briefing your confederates.

Lessons 28-33: Research on Air Pollution: This is one of two extended sequences near the end of this unit in which students are asked to design, conduct and report on their own inquiries into particular health-related subjects. During each of these sequences students will have the opportunity to review all the concepts and methods introduced in previous lessons, and to make practical use of those concepts and methods in planning, organizing and carrying out their own research projects. In this sense all of Unit I preceding Lesson 28 is "advance preparation" for these research sequences.

The Suggested Teaching Procedures for lessons 28-33 are very flexible. The nature of the advance preparations you will need to make for this sequence depends on the way in which you decide to teach the sequence. The following consists of suggestions which will be more or less useful, depending on how you use these lessons.

1. As you work through the lessons preceding this sequence, keep a running assessment of the abilities of your students to conduct independent research projects. Identify creative thinkers, strong personalities who might function well as leaders for group research projects, students who will probably need your direct supervision, and so forth.

2. Find out from the other two Biomedical instructors what they will be doing that relates to air pollution and when they will be doing it. Get and read the Science and Mathematics Students Text sections that bear on these activities. The other two Biomedical instructors may be able to help you or your students think of research projects that will relate directly or indirectly to activities in the other two courses.

3. Identify and make contact with possible sources of information (including guest speakers) and possible sites for student investigation in your community. Include manufacturers, volunteer groups, governmental agencies and others who are related to the subject of air pollution in any way: as generators of pollution, as monitors or controllers of pollution, or as lobbyists or spokespersons for any side in the complex and sometimes controversial debate over air pollution.

In addition to doing these things, you should read "Air Pollution" in the Student Text; the Suggested Teaching Procedures for lessons 28-33; and the Background Information section that follows them, in which you will find a list of research projects that students might undertake using the methods of inquiry introduced in this unit.

Lessons 40-45: Research on Community Health Maintenance Systems: This is the second of the two extended research sequences mentioned above. The sequence is preceded by two lessons in which students work toward designs for a health maintenance system for their community, or for segments of such a system. In the research sequence itself, students again have the opportunity to design, conduct and report on their own research projects. In both the preparatory lessons and the research sequence, the Suggested Teaching Procedures again allow you considerable flexibility in teaching the lessons.

Among the preparations you might make are the following.

1. As you work through the lessons preceding this sequence, keep an eye out for activities (especially student-initiated ones) which can serve as the basis for student inquiry in the sequence on community health maintenance systems. Students might be able to build on their earlier work in a number of areas, including community attitudes toward health and disease, the control of medical technology, and health careers.

2. Identify and make contact with possible sources of information and possible sites for student investigation of the subject of your community's health maintenance system. Include professional associations (medical, dental, pharmacological, nurses' and others); governmental agencies such as public health, sanitation and police; agencies providing specialized services such as suicide prevention, drug crisis intervention, treatment of or care for alcoholics, mental health crisis intervention and birth control information; and groups involved in political advocacy related to such things as child care, women's rights, the rights of the elderly and drug use.

3. Include in your evaluation of lessons 28-33 (the air pollution research sequence) assessment of which methods worked, which ones didn't, which ones could be improved on and which ones are probably better forgotten. Your students can be usefully engaged in the process of evaluating the first research sequence and, on the basis of their evaluation, planning for the second one.

In addition to doing these things, you should read "Designing a Health Maintenance System" in the Student Text; the Suggested Teaching Procedures for lessons 38-39 and for lessons 40-45; and the Background Information section for lessons 40-45, in which you will find a list of possible research projects for students.

Lesson 46: Review: This lesson has been set aside for a review of Unit I. While it would be possible to conduct a review in one class period, you may find it worthwhile to extend review activities over two or more days.

You and the other two Biomedical instructors should design an interdisciplinary review activity for the end of the unit. This might take the form of one or more interdisciplinary review problems, for individual writings or for group work, which would give students the opportunity to apply concepts, skills and knowledge from all three Biomedical courses. Such problems can be based on fictional case histories which you and your colleagues prepare. One or more of them might be based on current events in health, disease and health care. We urge you to keep an eye out during all of Unit I for current events that might be useful for this purpose; anything related to air pollution, respiratory disease or both is a prime candidate for study as an interdisciplinary review problem in this unit.

You will find further suggestions in the Advance Preparations section preceding the Suggested Teaching Procedures for lessons 40-45, and in the Suggested Teaching Procedures for Lesson 46.

INTRODUCTORY LESSON: ORIENTATION TO THE BIOMEDICAL CURRICULUM

SUGGESTED TEACHING PROCEDURES:

The two purposes of this lesson are to inform students of the basic structure and intent of the Biomedical Curriculum, and to demonstrate to students that their three instructors are working as an interdisciplinary team. To accomplish this, you and your two colleagues should meet with the students for the first class period of the semester. If Science is the first of the three classes scheduled, all three instructors may still have a full class period to dispose of administrative details. If this is not the case, you may be able to arrange schedules so that each of you will have at least some of your own class time with the students. Although arranging schedules so that three teachers are free during the same period may be difficult, starting the course with joint orientation will go far toward encouraging you and your students to approach curricular topics with an interdisciplinary perspective.

This first meeting can be organized in a number of ways. An essential ingredient is the provision for student questions. This will allow students to see how you and your colleagues interact as a team. Each of you may wish to react to the entire program from your own perspective, thus allowing students the opportunity to see how different perspectives can and should be applied to a central topic such as health.

Specifically, your team may be able to locate an article in the local newspaper which will allow each of you to indicate how your teaching area can provide a perspective on the topic. For example, a drought or famine in some area of the world, accidents, coronary heart disease, or organ transplants are appropriate for analysis by the mathematician, the natural scientist, and the social scientist. A statement about changes in the health characteristics of a population, such as an increase in the frequency of an illness, or an increase in the proportion of persons over sixty-five, is also appropriate for analysis from all three perspectives. A health care delivery topic, such as a shortage of equipment or a financial dilemma, can be used to illustrate how all three perspectives may be applied.

Other examples will occur to you and your colleagues as you plan for this meeting, or you may want to use another approach. The organization of this initial lesson is not as important as the results you are able to obtain in orienting students to the curriculum in an interdisciplinary manner.

In the next class session each of the three teachers may have time to pursue in greater depth the perspective each course can supply for a health topic. If students come to understand that the three courses will seldom be totally related to each other on specifics, but will often be related to each other on general topics, they will begin the course of study with the appropriate interdisciplinary approach.

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LESSON 1: INTRODUCTION TO BIOMEDICAL SOCIAL SCIENCE

SYNOPSIS:

After hearing your introductory remarks about the course and about this Unit, students will read two brief statements about the health behavior of Americans. The reading is preparatory to a homework assignment in which the student observes and records health-related behaviors of persons he normally has contact with.

OBJECTIVE:

The student will observe and record behaviors of himself and others which he believes to be related to health.

SUPPLIES:

Biomedical Social Science Student Text, Unit I (one per student)

STUDENT TEXT:

Reading: Americans and Their Health

SUGGESTED TEACHING PROCEDURES:

A. Introduction to the Course: The following points should be included in your opening remarks to students.

1. Biomedical Science and Biomedical Social Science have been designed to complement each other. The content of both courses is related to health, disease and health care. But in Science students will study these subjects from the points of view of biologists, chemists and other natural scientists, while in Social Science they will study them from the points of view of economists, psychologists and other social scientists.

2. A given unit in Social Science will not always be about the same content as the unit students are working on at the same time in Science. However, from time to time there will be sequences of lessons, and sometimes whole units, in which students study the "social-science side" of something they have just studied, or are about to study, from the "natural-science side." For example, in Unit I of Science students will study some chemical and meteorological aspects of air pollution and the relationship of pollutants to respiratory disease, and in Unit I of Social Science they will study some economic, political and social aspects of the casues of air pollution and the ways of controlling it.

3. Unit I of Biomedical Social Science has been designed as an introduction to the rest of the course. Students should approach it as a guided tour of territory to which they will later be able to return for a closer look. They may feel at times during this unit that they are being whisked along a bit too quickly, but they should be comforted by the fact that they will not be expected to memorize

it all from this first brief glance. What they will be expected to do is to try a number of ways of looking at things which they probably haven't tried before, and to use these mehtods in studying air pollution and some other health-related problems in American society.

B. Reading in Preparation for the Homework Assignment: Distribute the Student Text and ask students to read "Americans and Their Health," the first reading in the book. This short reading presents two opposing opinions: that Americans are preoccupied with health, and that Americans ignore their health. Postpone discussion of the reading until the next lesson.

ASSIGNMENT:

The assignment is to spend the time from the end of this class meeting until the beginning of the next class meeting (i.e., a whole day) as an observer of American health habits. Each student is to record everything he sees people doing which, in his judgement, is related to health.

The student should not change any plans or do anything different from what he would do ordinarily. He should try to avoid taking notes in front of people, but he should feel free to explain the assignment he is working on if anyone asks.

The student should record nothing except health-related behavior: no names or other information about the people he is observing. He should record his own health-related behavior as well as that of others he observes.

Students' observations will be discussed in the next lesson.

LESSON 2: WHAT IS HEALTH?

SYNOPSIS:

Students first discuss the health-related behaviors they have observed, then discuss the question, "What is health?" without necessarily reaching any conclusion.

OBJECTIVES:

The student will describe at least one behavior which he has observed on the part of himself or of someone else and which he believes is related to health.

The student will describe at least three possible definitions of health.

STUDENT TEXT:

Some Definitions of Health

SUGGESTED TEACHING PROCEDURES:

A. Discussion of the Homework Assignment: Start the class with discussion of what the students observed. You might keep a list of "health-related behaviors" on the chalkboard, adding to it as students mention the things they have observed. You may wish to use tally marks to indicate repetitions of the same behavior; however, the reason for writing these behaviors on the chalkboard is to illustrate the range and variety of behaviors students have identified, not to quantify the results.

It is possible to introduce the question, "What is health?" during this part of the discussion, by asking students why they think particular behaviors are related to health. Students may have radically different ideas of what "health-related behavior" is, and may therefore disagree on some items listed on the chalkboard. You might wish to indicate controversial items in your list by means of identifying marks. Try to postpone discussion of controversies until the latter part of the discussion.

B. Discussion of "Americans and Their Health": Remind students of the two opinions expressed in the previous lesson's reading, and ask for their opinions on this question. Is one side or the other right? Does the truth lie somewhere in between?

Several points may emerge during this part of the discussion. One is that it is practically impossible to say anything that is true of all Americans, because there are so many of us, we differ in so many ways and we are all continually changing. Another is that, even if it were possible to generalize about Americans, it would not be possible for the students to do it on the basis of their limited obeservation of their family members and friends. Both these statements are true and, if students mention them, should be acknowledged and pursued. In later lessons there will be further discussion of these points.

Another point that may emerge, if it has not emerged already, is that whether one thinks Americans are preoccupied with health depends on how one defines health. When this point is expressed by a student, it is time to start the next part of the discussion.

C. What Is Health, Anyway? If students have already expressed disagreements among themselves over what health is (by disputing others' observations in the opening discussion), then those disagreements will provide the starting point for this part of the discussion. Students who have positions on this question should be encouraged to verbalize their objections.

If there is a shortage of ideas, refer students to "Some Definitions of Health," in the Student Text. If students are asked to point out similarities and differences among the definitions, they should also be able to identify several features that might occur in a definition of health. Some of these definitions concentrate on the individual and his awareness; some concentrate on the relationship between the individual and his surroundings. Some emphasize the physical, some the psychological, some neither. Some are "static," referring to stable conditions; some are "dynamic," referring to processes, change and adaptation. Finally, some associate health with an absence of undesirable conditions and some associate it with the presence of desirable conditions.

It is not necessary in this discussion that the class or individual students reach a conclusion about the nature of health. The discussion is intended only to introduce the question. At the present time it is important to keep the question open, to encourage variety and speculation.

ASSIGNMENT:

There is no assignment.

LESSON 3: TALLYING QUESTIONNAIRE DATA

SYNOPSIS:

Students respond to a short questionnaire, then spend the remainder of the class period tallying data from completed questionnaires. As a homework assignment, students write about the questionnaire items and about the conclusions that can be drawn from the data.

OBJECTIVES:

The student, as a member of a group, will participate in the tallying of two or more items from a set of completed questionnaires.

The student will record the data the class has tabulated.

The student will describe in writing either (1) sources of difficulty for resondents in responding to one or more questionnaire items, (2) reasons why one or more items might or might not be expected to yield useful information, (3) kinds of information that might be derived from comparison of at least one pair of variables or (4) one or more generalizations that can be drawn from the data the class has compiled.

SUPPLIES:

Questionnaire: American Health Behavior (one per student plus extras for tallying)

STUDENT TEXT:

Sample Tally Sheets

Assignment: Questions about the Questionnaire

Reading: Designing and Using a Questionnaire (optional)

SUGGESTED TEACHING PROCEDURES:

A. Administering the Health Behavior Questionnaire: To introduce the use of questionnaires in survey research, students are asked to experience, first-hand, what it is like to be a respondent in this method of inquiry. Distribute the handout, "Questionnaire: American Health Behavior," and ask students to complete it right away. The questionnaire is not easy to respond to. Some of the questions are vague, others are very personal. These drawbacks have been included intentionally, and students' reactions to them will be discussed later. In order to set the stage for that discussion, don't spend much time assisting students in completing the questionnaire, but do encourage them to take it seriously and to respond to it as best they can. When the class has completed the questionnaire, collect the responses. Collect males' and females' responses separately, and place them in separate piles. Count each pile and write the totals on the chalkboard--e.g., "M=13, F=17, T=30."

B. Tallying Data from the Questionnaire: The process of tallyin is an important one, and students should have first-hand experience with it. There are raw tallies, and tallies according to variables being investigated. By dividing the class into groups you can ensure that both types of tallies will be done. What follows is a suggestion for one way to organize the tallying; after reading it you should decide how you wish to divide your class and what variables each group will be tallying. Most groups should consist of three students, one to read responses and two to record them; when the group has finished tallying, the two recorders can compare their totals to determine whether they agree.

1. Select variables for comparison. Determine how many groups you will be able to form (a maximum of ten groups in a class of thirty), then determine which combinations of variables groups should tally.

a. One group might tally the whole questionnaire. Since this would be a very time-consuming task for a group of one reade and two recorders, you might form a group of six recorders, each one reading and recording responses to two of the 12 items on the questionnaire. These raw tallies can be used to determine things about the class as a whole: how many have been hospitalized, how many smoke cigarets, etc.

b. Groups of three might tally each of the two following pairs of variables, or other pairs you may think of.

- sex (item 1) and cigaret smoking (item 9)
- sex (1) and attitude toward personal health (11)
- sex (1) and drug use (8)
- cigaret smoking (9) and attitude toward personal health (11)

- attitude toward personal health (11) and estimate of others' attitudes toward personal health (12)

- hospitalization (6) and attitude toward personal health (11)

- evaluation of own health (2) and attitude toward it (11)

- drug use (8) and cigaret smoking (9)

2. Prepare groups for tallying. Time spent in advance preparations can greatly simplify the tasks of the groups. Here is a list of things that might be done.

a. Assign an identifying letter or number to each combination of variables to be tallied. Form one group for each combination and give each group the identifying letter or number corresponding to the variables it will be tallying. The group can put this identifying mark on each questionnaire it has tallied, and thus avoid tallying a questionnaire twice or not tallying it at all.

b. Arrange the groups more or less in a circle around the classroom, so that piles of questionnaires can be passed from one group to another with a minimum of confusion. Instruct each group of three (one reader and two recorders) that the reader should hold on to each pile of questionnaires he gets until he has read them all and the recorders have recorded them all. He should place his group's identifying mark on the back of each questionnaire as soon as he has read the responses from that questionnaire; then, when he has read the whole pile, he should pass it on to the next group. If you have a group of six tallying the whole questionnaire, the last person in that group should be responsible to place the group's identifying mark on each questionnaire and should hold each pile of questionnaires until the group has finished with that pile. The first person in that group, meanwhile, should not start on a new pile of questionnaires until the person at the end of the line tells him that the preceding pile is finished.

c. See that each recorder has a tally sheet and knows how to use it. In the group tallying the whole questionnaire, each recorder needs either a blank questionnaire on which he can place tallies above the words to be circled or above the blanks in which check marks are to be placed; or a sheet of paper on which he has copied the numbers of the two questions he is tallying and the possible answers, as shown in the example below.

1. female 𝍸 𝍸 ||| male 𝍸 𝍸 𝍸 ||

2. NEVER 𝍸 𝍸 𝍸 || SOMETIMES 𝍸 𝍸 REGULARLY |||

Only item 7 needs special handling. Responses to that item might vary widely. The recorder for that item might begin with a blank sheet of paper. When he gets his first completed questionnaire, he should write down the numeral the respondent has entered in the blank and, following that numeral, a single tally mark. When the same numeral appears on a later questionnaire, he can add another tally mark; when a different numeral appears, he can write down that numeral with one tally mark.

For a group tallying two variables, each respondent needs a grid like the ones shown in "Sample Tally Sheets," in the Student Text. Each group should design its own grid, and the two recorders in each group should be sure that their grids are identical.

d. Divide the questionnaire into a number of piles equal to the number of tallying groups you have formed. (Each pile will contain responses of either males or females, which will make things a little easier for groups tallying sex and one other variable.) Give one pile of questionnaires to the reader in each group (and one to the first recorder in the group of six students tallying the whole questionnaire). Emphasize that each pile is to be kept together and that piles are not to be mixed. Also emphasize that each group must put its identifying mark on every single questionnaire it has tallied. These two precautions will prevent a great deal of confusion and wasted effort.

3. Tally responses. When all the instructions are clear and each recorder has a tally sheet, ask the groups to begin. Encourage them to work slowly at first and to stop everything and ask questions if they get confused. Each time a group gets a new pile of questionnaires, the reader (or first recorder in the large group) should check the back of the questionnaires to be sure the group has not yet tallied that pile. All piles should be passed in the same direction. As piles get back to the groups that first tallied them, you should collect the piles and check the backs of the questionnaires to be sure that all groups have tallied them.

4. Prepare totals. The group that tallied the whole questionnaire should use a blank questionnaire on which to record its totals. Each total should be written above the word to be circled (e.g., a "13" above "female" and a "17" above "male") or in the space left for a check mark. Responses to item 7 may have to be indicated on a separate sheet, depending on how many different responses there were. Each group that tallied two variables should prepare a new grid with numerical totals in place of tally marks, and add the subtotals and the "N" total. (See "Sample Tally Sheets," in the Student Text.)

C. Preparation for Homework Assignment: A representative of each group should display the group's totals on the chalkboard. A group that tallied two variables should display a grid. The group that tallied the whole questionnaire should write the item numbers

(1-12); after each item number, the possible responses; and after each possible response, the total number of respondents who gave that response. Check the "male," "female" and "N" totals against your questionnaire count.

After all totals have been written on the chalkboard, each student should copy all the totals for his own use in the assignment and in the next lesson's discussion. In addition to the totals, each student will need a copy of the questionnaire, so you should distribute the used questionnaires. Students may want to have their own questionnaires, since several of the questions they have answered are rather personal. You should make a permanent record of the data if they cannot be kept on the chalkboard until the next lesson.

ASSIGNMENT:

The assignment, "Questions about the Questionnaire," in the Student Text, gives four questions that require written answers. You might divide the class approximately into fourths, assigning one of these questions to each quarter of the class. You can, of course, add questions of your own devising, omit some of the questions given in the assignment, or both.

Note that the reading, "Designing and Using a Questionnaire," which follows this assignment in the Student Text, gives hints for answering the questions in the assignment. You might wish to include this reading in the assignment, asking students to look it over before or after they have answered the questions. Alternatively, you might leave this reading until the next lesson.

QUESTIONNAIRE: AMERICAN HEALTH BEHAVIOR

Instructions: This questionnaire is intended to measure the attitudes and behaviors of Americans with regard to their personal health. Your answers should be as accurate as possible; when in doubt, estimate. Your own answers, taken alone, are of no interest to this research. However, your answers will be tallied along with those of others participating in this survey so that general statements about American health behavior can be made. Your cooperation is appreciated.

1. Sex (circle one) FEMALE MALE

2. How do you evaluate your own health? (circle one)
   EXCELLENT GOOD POOR

3. During the past twelve months, have you seen a physician?
   (circle one) YES NO

4. If you answered "Yes" to question 3, were any visits for purposes other than a checkup or examination? (circle one) YES NO

5. During the past twelve months, have you been admitted to a hospital? (check one)
   NEVER_____ ONCE_____ TWICE_____ THREE OR MORE TIMES_____

6. If you did not check "Never," were any admissions for purposes other than a checkup or examination? (circle one) YES NO

7. If you answered "Yes" to question 6, indicate the total number of days you were in hospitals during the past twelve months._____

8. Do you take drugs? (circle one) NEVER SOMETIMES OFTEN

9. Do you smoke cigarets? (circle one) NEVER SOMETIMES REGULARLY

10. Do you exercise? (circle one) NEVER SOMETIMES REGULARLY

11. What is your attitude toward your own personal health? (check one
    VERY CONCERNED_____ SOMEWHAT CONCERNED_____ NOT CONCERNED_____

12. What do you think is the attitude held by most Americans about their own personal health? (check one)
    VERY CONCERNED_____ SOMEWHAT CONCERNED_____ NOT CONCERNED_____

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LESSON 4: ANALYSIS OF QUESTIONNAIRE

SYNOPSIS:

In this lesson students discuss the usefulness of the items on the questionnaire they have responded to and tabulated, and the generalizations that can be drawn from the tabulated data. As a homework assignment, students write questionnaire items designed to find out what respondents think "health" is.

OBJECTIVES:

The student will describe sources of difficulty for respondents in responding to at least three items on the questionnaire.

The student will assess the usefulness of at least three items on the questionnaire for learning about the attitudes and behaviors of Americans with regard to their personal health.

The student will state at least three questions that can be answered by comparing data from pairs of items on the questionnaire.

The student will identify a population to which he thinks it is possible to generalize from the data the class has assembled.

The student will state at least one generalization drawn from the data the class has assembled.

The student will write at least one questionnaire item to find out what respondents think "health" is.

STUDENT TEXT:

Some Definitions of Health

Designing and Using a Questionnaire

SUGGESTED TEACHING PROCEDURES:

This entire lesson can be devoted to discussion of the questionnaire. We recommend that discussion begin with the questions given in the assignment, "Questions about the Questionnaire," in the Student Text (and any other questions you may have assigned), and proceed toward generalizations about the use of questionnaires in general. The reading, "Designing and Using a Questionnaire," which follows the assignment in the Student Text, may be read in conjunction with the next homework assignment. The four parts of these Suggested Teaching Procedures correspond to the four questions in the previous assignment.

A. Problems Respondents May Have Had: Elicit students' responses to the first question. Some items on the questionnaire were purposely made difficult to answer. For example, item 8 does not define "drugs"; a respondent might assume that the word refers to all drugs--medical and nonmedical, legal and illegal--or only to a particular class of drugs, such as prescription drugs, or drugs like aspirin and nonprescription sleeping pills, or substances such as tobacco, alcohol and coffee, or substances such as marijuana, cocaine and heroin. *Item 3* is carelessly worded: to "see a physician" might mean to visually perceive one or to consult one for medical advice or treatment. *Item 10* does not give any indication what "exercise" is; it could include walking to school every day or playing an occasional game of basketball, or it might be restricted to a regular program of calisthenics or other physical exertion specifically intended to improve muscle tone, circulation, etc. *Item 11* and *item 12* leave the meaning of "concerned" completely up to the respondent.

If students are unable to identify any difficult questions, you might ask them what they think these questions mean. If they report differing interpretations of the same question, you might then ask them to rephrase the ambiguous question so as to make it unambiguous. (Each could be rephrased in any of several ways, depending on the kind of information the inquirer is after.)

Some items on the questionnaire ask for personal information. Students may have found "too personal" any of the questions about their attitude toward their health, about their experience with doctors and hospitals or about their drug use. If students do not identify any items on the questionnaire as being too personal, you might ask how students *felt* when they read items 2-9 and item 11. Point out, if students *do not*, that some respondents might be tempted to give false answers to these questions.

B. *Usefulness of the Items*: The items on the questionnaire all have something to do with "the attitudes and behaviors of Americans with regard to their personal health," but some of them are not as closely related as others to the purpose of the questionnaire. Items 2 and 11 ask for the respondent's thoughts about his own health. Items 3-10 ask the respondent to describe a variety of behaviors related to health, but the questions are rather uneven: they elicit a great deal of information about the respondent's experiences with doctors and hospitals, but very little information about things the respondent might do which are hazardous to his health (only items 8 and 9 elicit such information) and very little information about things the respondent might do to protect his health (item 10 and possibly item 3). Finally, item 12 asks what the respondent thinks other people think about their health, which has little or nothing to do with the respondent's own attitudes and behaviors with regard to his own health.

C. *Information Gained by Comparing Variables*: What students have to say about this subject will depend mostly on which variables you had them compare. Comparing sex (item 1) with any other item might indicate whether there is a difference between the attitudes or behaviors of males and females. Comparing the respondents' evaluation of their own health (item 2) with any other variable might indicate differences between the attitudes and behaviors of people who think they are in excellent health and those of people who think they are in poor health. (Are people who think they are in poor health [item 2] more likely than others to be very concerned about their health [item 11]? Are they more likely to have "seen a physician" lately [item 3]? To have been admitted to a hospital [item 5]?--and so on.)

D. Generalizations from the Data: What generalizations can be drawn depends, of course, on how the students answered the questionnaire. Encourage students to seek and to express verbally as many generalizations as possible, both from the comparisons of pairs of variables and from the display of the raw data. When there are no more generalizations, go on to the more important question (for the purpose of this lesson), which is, about whom are the students generalizing? Are their statements true only of members of the class? Is the class sufficiently representative of the student body of the school to make the generalizations true of students in the school as a group? Is the class representative of all teenagers in the community? In the state? In the nation? In the world? This discussion will probably bring out the observation that it is very difficult to know what a group of respondents is representative of, if anything; it is a true observation. Assure the students that there are ways of determining that a particular sample is probably representative of some larger population, and inform them that these methods require the use of statistical computations which they will encounter in a later unit of Biomedical Mathematics. For the purposes of this unit, it is sufficient for students to be aware of the problem and to arrive at intuitive judgements about what population a given group of respondents is a representative sample of.

ASSIGNMENT:

During the next class session the class will construct a questionnaire to determine how people define health. The homework assignment should be to write questions that can be used as items on such a questionnaire. Before giving the assignment you should decide what population students should investigate. Depending on the nature of your community and your class, students might be able to find respondents who, collectively, they think will make up a representative sample of people in the community; or they may be able only to find respondents representative of students in the school or of teachers in the school. (It may be possible to survey both students and teachers and compare the responses; how complex the "sampling" should be depends on your own assessment of the situation.)

You may also need to give students some help in deciding what the question means. You may suggest that they write questionnaire items about such things as whether people think they are healthy, how they know they are healthy, how they know when they are sick, whether they think health is a purely physical matter, whether they think some sort of adjustment or adaptation to the environment is necessary for health, etc. Students might review "Some Definitions of Health," the second item in the Student Text, to get ideas. Encourage students to think of as many questions as possible and to put into practice the things they have learned about questionnaire construction from their work in class and from the reading, "Designing and Using a Questionnaire," in the Student Text. (This reading should be made part of the assignment if students have not read it already.)

LESSON 5: CONSTRUCTING A QUESTIONNAIRE

SYNOPSIS:

The class spends the hour selecting and refining questions to be used as items on a questionnaire to determine what respondents think "health" is. As a homework assignment, each student administers the questionnaire to one or more respondents and records the responses for use in the next lesson.

OBJECTIVES:

The student will contribute one questionnaire item or suggest one improvement (by the criteria described in student readings) in an item contributed by another student.

The student will administer a questionnaire to at least one respondent and record the responses.

SUGGESTED TEACHING PROCEDURES:

A. Construction of a Questionnaire. Using the results of the assignment, spend the class period combining and refining questions to produce a short questionnaire. The questionnaire should be so short that students can copy it in their notebooks and administer it orally. (Of course, if your class meets early in the day, and you have time to type and reproduce the questionnaire, students can pick up copies before they leave school for the day.)

Review the purpose of the questionnaire and the population being investigated. The purpose determines which content items are useful. The population dictates the identification items--age, sex, occupation, etc.

In selecting items for the questionnaire, use the criteria established in the previous discussion. Each suggested item might be met with the challenge, "How will this help answer the central questions we are investigating?" or, "How is this question better than others that have been suggested?" Duplications can be eliminated: two or more questions can be combined and rewritten to better meet the challenge. The final result (probably not more than five or six questions, and possibly fewer) should be written on the board so that students will be able to copy it exactly as it was designed.

B. Selection of Respondents: Determine, with the class, how students should select respondents and how many respondents each student should interview. If you want equal numbers of male and female respondents, you should either have half the class interview males and half interview females, or have each student interview equal numbers of respondents of both sexes. Similarly, you can get equal numbers of adults and children, teachers and students, etc.

ASSIGNMENT:

The assignment is to conduct interviews with respondents and to record their answers to the questions. Each student should prepare a new sheet for each respondent, or if the same sheet is used on more than one, prepare a separate answer sheet showing the responses of each respondent.

LESSON 6: TABULATING AND ANALYZING QUESTIONNAIRE DATA

SYNOPSIS:

In this lesson students discuss the experience of interviewing respondents, tally the data they have obtained with their questionnaire and formulate generalizations from the tabulated data. As a homework assignment, students read a story describing an emergency health care delivery situation.

OBJECTIVE:

The student, as a member of a group, will participate in the tallying of two or more items from a set of completed questionnaires.

The student will derive one generalization from the data the class has tabulated, or identify the particular data supporting one such generalization.

EQUIPMENT:

Hand calculator (for calculating percentages, optional)

STUDENT TEXT:

Reading: Emergency

SUGGESTED TEACHING PROCEDURES:

A. Reflecting on the Interviews: This is the least important aspect of the lesson. However, students will want to discuss some of their experiences. One thing that can be discussed is what students did with unwilling, resistant or confused respondents. What did they do if a respondent refused to answer a question? What did they do if a respondent insisted on giving more than one answer to the same question? What did they do if they could not categorize the respondent's answer according to the answers on the questionnaire?

B. Tallying the Results: If comparisons among answers to two questions are to be made, the same procedure can be used that was followed in Lesson 3. If a general summary is all that is needed, students can call out the responses or go to the chalkboard and record them. You will be able to determine the best procedure for obtaining tallied results.

If a large number of responses is obtained, you may want to ask students to convert raw data to percentages, using a hand calculator if possible. The advantages of this procedure are obvious in the following example. Suppose one item asked the sex of the respondent and another asked, "Do you believe you are in good health?" If there are 125 female respondents and 75 male respondents, raw comparisons won't help much in determining whether males or female generally are more likely to believe they are in good health. This is especially true if there are more than two possible answers to the health question. Knowing the number of males who respond "Definitely" and the number of females who respond "Definitely" doesn't help much. But knowing the percentage of females and the percentage of males who respond "Definitely" will allow easy comparison by sex. The procedure is straightforward: divide the number of male "Definitely" responses by the total number of males responding to that question, and follow this for the other possible response(s). Then do the same for females responses to the question. Then you can make statements such as, "31% of the male respondents believe they are definitely in good health, while 56% of the female respondents believe they are definitely in good health."

C. Generalizations and Conclusion: When all the totals are on display, students should be able to make several kinds of generalizations. If pairs of variables have been compared, they should be able to make one generalization based on each comparison. Using the raw data, they should be able to make generalizations about the respondents as a group. Finally, they should be able to make some sort of generalization in response to the question, "What do people think health is?"

All generalizations should be stated in terms that restrict them to the respondents as a group or to any larger population of which the students think the respondents are a representative sample.

In answer to the last question, it may be impossible to say more than, "The respondents (or population) have mixed opinions on the nature of health," or it may be possible to say, "The respondents (or population) generally believe health is mostly a physical matter," or something else equally specific, depending on what sorts of questions were asked. No matter what the generalization is, however, students should be encouraged to think and talk about the implications of this finding for health care. This may be made the topic of a writing assignment.

ASSIGNMENT:

Assign the reading, "Emergency," in the Student Text.

LESSON 7: DISCUSSION OF "EMERGENCY"

SYNOPSIS:

Students discuss the homework reading, then each student reads some additional information about the point of view of one character in the story. The class then discusses the next homework assignment, which is for each student to rewrite the story from the point of view of one character.

OBJECTIVE:

The student will rewrite the story, "Emergency," from the point of view of one of the seven characters in the story, showing the concerns of that character.

STUDENT TEXT:

Reading: Seven Points of View on "Emergency"

SUGGESTED TEACHING PROCEDURES:

A. Discussion of the Homework Reading: Ask for students' responses to the reading, "Emergency." If students want to describe similar experiences (or very different ones) that they have had in health care delivery situations, they should be encouraged to do so. Discussing their own and their classmates' experiences may help them identify with the characters in the story.

B. Introduction of Seven Points of View: Direct students' attention to the reading "Seven Points of View on 'Emergency,'" immediately following the story in the Student Text. Tell the class that each student will be asked to read the introductory paragraph and one of the points of view described. As a homework assignment, each student will be asked to rewrite the story, describing the situation as it was perceived by the character whose point of view the student has read about.

Divide the class approximately into sevenths and assign one point of view to each group. It is not necessary that students seat themselves in groups. The reason for dividing the class is simply to ensure that approximately equal numbers of students will be reading about, and writing from, the several points of view. When the class has been divided, ask the students to read the assigned portions.

C. Preparation for the Writing Assignment: Describe the writing assignment and ask whether there are any questions. If any students feel that they are not capable of writing a story, encourage them to try. Students should be aware that their objective is not to write literature, but only to try to understand how one person in this situation feels about what is happening.

If a student doesn't understand the "point of view" he has read, encourage discussion of that point of view by the students who have read it. Again, place emphasis on the character in the story. What does this person think is important? What does the person think is going on? How does the person feel about what he thinks is going on?

Some students may feel that the characters they have been assigned to write about are stupid, evil or otherwise undesirable people. If you perceive such feelings on the part of students, it is important that you try to get these students to empathize with their characters, to imagine that they are these characters and see what it might be like to be them. A good way to empathize with a character is to make up a biography of the character--to think about what the character has been through to make him the way he is. Some students might wish to try writing brief biographies before they tackle the assigned writing.

Students should write their stories in the first person, as though they were telling someone else about their own experiences. Since the original story is not written in the first person, this part of the assignment might require some explanation and examples.

ASSIGNMENT:

Each student is to rewrite the story, "Emergency," from the point of view of the assigned character. Most stories should begin with the entrance of the family into the emergency receiving room of the hospital, although some stories (particularly those of the family members, who witnessed the accident) might begin at an earlier point. Students should invent whatever details they think are important to the characters they are writing about. You may wish to impose a minimum or maximum length requirement.

LESSON 8: POINTS OF VIEW ON "EMERGENCY"

SYNOPSIS:

After several students' stories are read to the class, students discuss the ways in which the various characters perceive and feel about the events of the story and the effects of the characters' behavior on the wounded child. The homework assignment is a reading on medical technology.

OBJECTIVES:

The student will describe the perceptions and feelings of at least one character in the story.

The student will describe at least one way in which a character other than the wounded child could contribute to the healing of the child.

STUDENT TEXT:

Reading: Medical Technology

SUGGESTED TEACHING PROCEDURES:

A. Reading of Students' Stories: Ask for volunteers to read their stories aloud to the class, or collect the stories and read some of them to the class yourself if you think students will be unwilling to read. Try to get readings of as many different characters' stories as possible. Postpone discussion of the students' stories until after the stories have been read.

B. Discussion of the Points of View: Discussion should focus on the characters and their viewpoints, not on the literary quality or depth of the students' stories. If students make critical remarks about a story that has been read, turn the discussion toward the perceptions and feelings of the character whose point of view the story represents.

Ideally, the class should discuss one point of view at a time. The students who have written from the point of view under discussion should be asked to describe what the character thought was important in the situation, what the character thought about the other characters, how the character felt about what went on in the hospital and how characters other than the child might have contributed (or did contribute) to the healing of the child.

C. Discussion of the Events of the Story: Several points should be made about the story. Students may raise any or all of these points during the discussion of individual points of view. If they do not, you should raise them.

1. One point of view that has not been discussed is that of a completely disinterested observer of the child's wound. From that point of view, the important thing about this situation is that a circulatory system has got a hole in it, and if the hole is not stopped up the organism may be permanently damaged or even die. That is certainly important. However, if one is aware of nothing else in this situation, one misses most of what is going on. Each of the other points of view adds to one's understanding of the wounded child and his relationship with his environment.

2. Each of the other points of view, the ones that have been discussed, also gives an incomplete picture of this situation. No single character is aware of, or concerned about, everything that is happening.

3. Each of the viewpoints is related to some or all of the others. What each character does and says affects what other characters think, feel and do. Conversely, each character's behavior is affected by other characters' behavior.

4. Each character's behavior, and therefore each character's perceptions and feelings, can or does affect the wounded child, and can or does help calm him or heal his wound or both.

These observations are true not only of the characters in a story, but also of participants and observers in real situations.

And they may be applicable not only to situations in which interest is focused on an individual (such as the child with the wound) but also to situations in which interest is focused on families, communities and societies. These observations do not need to be discussed in detail in this lesson, but they should be introduced.

ASSIGNMENT:

Assign the reading, "Medical Technology," in the Student Text. The reading introduces the topic of the next three lessons.

LESSON 9: SEVEN POINTS OF VIEW ON MEDICAL TECHNOLOGY

SYNOPSIS:

Students discuss the vocabulary of the homework reading on medical technology, then each student reads a description of the problem of controlling the use of medical technology as that problem is perceived from one "point of view." As a homework assignment, each student works toward a plan for controlling the future use of medical technology, emphasizing the point of view he has read about.

OBJECTIVES:

The student will define technology as material things and processes that people use for particular purposes.

The student will define medical technology as technology for the detection, cure and prevention of disease and for research on health and disease.

The student will describe facts, opinions, alternative courses of action or preferences which he thinks are related to the problem of controlling the use of medical technology as the problem is perceived from a given point of view.

STUDENT TEXT:

Reading: Seven Points of View on the Future of Medical Technology

SUGGESTED TEACHING PROCEDURES:

A. Discussion of the Homework Reading: Discussion of the reading "Medical Technology," should be directed toward clarification of the vocabulary introduced in the reading. The issue itself--whether and how the use of medical technology should be controlled--will be discussed at length in the next two lessons. The initial reading is intended only to introduce the subject matter.

"Technology" is broadly defined in the reading, to include both material things and procedures that people have developed to use for some purpose. To help clarify this concept you might ask students to give examples of technologies other than medical technology. For example, if students are asked what "educational technology" is they should identify material things ranging from books, pencils and paper to school buildings, football fields, buses and even parking lots; they should identify techniques and procedures ranging from spelling bees and arithmetic problems to educational administration and methods of teaching teachers how to teach. Similar discussions could be conducted with reference to transportation, politics, sports or any other field of human endeavor that students are familiar with.

The reading defines "medical technology" to include technology for detecting disease, curing disease, preventing disease and doing research related to health and disease. The ideas of detecting, curing and preventing disease are straightforward, although students may not be accustomed to thinking of such things as bandages and over-the-counter drugs as "medical technology." If they have difficulty with this idea, make clear that all things and procedures used for medical purposes are included in the broad definition of "technology" given above, whether these are used by health professionals or by ordinary citizens.

Students may be more or less unaware of the vastness of medical research technology. As the reading points out, practically any kind of natural-science research may turn out to have some use in medicine, whether the research was intended to produce "medical technology" or not. The important point here is that if it can be used in medicine, then it is medical, no matter who discovered or invented it or what he was looking for when he did so.

The interrelatedness of the natural sciences is, of course, more in the province of Biomedical Science than of Biomedical Social Science. You might point out, however, that in Science students have been and will be learning about chemistry, physics, anatomy, physiology, genetics, pharmacology and other sciences, but that they will be learning particular things from these sciences--things that are in some way related to medical technology. For students in this curriculum, the important thing is not that the technology they learn about was created by a chemist or discovered by a geneticist, but that it is useful in medicine.

Students may object to the apparent abstractness of this reading. They have just been reading and writing about particular people in a particular situation, and now they are being asked to think about a whole society and its medical technology. The point that should be made if this objection surfaces is that what goes on in the society as a whole often affects what happens to particular people. If a person cannot get medical treatment, or cannot get a job in his chosen medical field, or does not like the way his doctor treats him, he may find it easier to understand and to cope with his situation if he realizes that his problem is a national phenomenon, not just a local aberration (though some such problems are, of course, local). What can be done about a problem depends on the source of the problem. Many problems people face in a large society such as ours--including health problems--are generated by very large-scale processes; they cannot be understood, much less solved, in a small-scale way.

B. Introduction to Seven Points of View: Direct the students' attention to the reading, "Seven Points of View on the Future of Medical Technology," in the Student Text. As before, divide the class approximately into sevenths, and assign each group to one of the seven points of view. Each student will read the introductory section and the assigned point of view. In the next lesson, you will form groups of students; each group will include seven students, each representing one point of view. (There will, of course, be extra students in some groups if your class membership is not an exact multiple of seven.)

You may wish to describe the homework assignment (see below) before the students read the assigned points of view. If you do so, students will be able to think about their assignment while they are reading, and they will be better able to ask questions after they have finished the reading.

When you have divided the class and (if you think it advisable) described the assignment, ask the students to read the assigned points of view.

C. Discussion of the Homework Assignment: When the students have finished reading, describe the assignment if you have not already done so. The assignment is purposely vague; you can restrict it as you see fit, leaving students as much leeway as you think they can handle. Students may be uncomfortable with the assignment because it is speculative in nature and they really do not know much about the subject matter. Encourage them to speculate freely and make maximum use of what they do know. Their objective in the writing assignment should not be to make decisions or lay down criteria, but to think about what the options are and, if they can, to express preferences among the options.

ASSIGNMENT:

Each student is to begin constructing a plan for the futute of medical technology in America, concentrating on the problem described in the "point of view" section the student has read. Short of actually writing out a plan, a student may do groundwork such as listing the things that need to be considered and the reasons for considering them, writing down opinions of his own which he believes are related to the problem, or listing reasons why it is difficult or impossible to make a plan. Another thing a student might try is planning "extreme solutions" (at least two), then listing the positive and negative aspects of each, then designing a compromise.

("Extreme solutions" are things like putting all resources into research and not into treatment, and vice versa; putting all decision-making authority in the hands of the people by direct vote, and putting it all in the hands of experts who are in direct contact with the work; giving everyone a complete medical education, and giving only a few people highly specialized medical educations; making individuals completely responsible for their health, and making the society [i.e., the government] completely responsible; and so on).

A third thing a student might try is to describe, as well as he can, the present situation of medical technology from the point of view he has read about; then identifying things he likes and doesn't like about it; then describing an imaginary situation he likes better.

LESSON 10 and 11: CONTROLLING THE USE OF MEDICAL TECHNOLOGY

SYNOPSIS:

In the first of these two lessons students meet in groups, each comprising "experts" who have thought about the use of medical technology from seven different points of view. Each group works toward a unified view of the problem of controlling the use of medical technology on the level of the whole society and a unified solution to the problem. As a homework assignment, students write about the advantages and disadvantages of combining seven points of view on a single problem and of studying a problem on the level of analysis of the society. In the second lesson, groups report and students discuss what they have written in response to the assignment.

OBJECTIVES:

The student will play the role of an expert on one aspect of the problem of controlling the use of medical techology.

The student, as part of a group, will attempt to combine seven points of view to produce a single view of the problem and what is necessary to solve it.

The student will describe at least one advantage and at least one disadvantage of studying a problem from seven points of view independently and combining what has been learned into one statement about the problem and its solution.

The student will state at least one advantage and at least one disadvantage of studying a problem on the level of analysis of society.

SUPPLIES:

Cards, 3" x 5" or larger, to be folded and used as nameplates (one per student)

SUGGESTED TEACHING PROCEDURES:

A. Preparation for Group Work: Begin the first class period by dividing the class into groups. Each group should consist of seven students, each of whom has read a different "point of view" in the reading assignment. If your class membership is not an exact multiple of seven, there will be extra students. These should be distributed among the groups so that there are some groups of seven students and some groups of eight. Do not form a group of fewer than seven students; each group should include representatives of all seven points of view.

Before the class breaks up to form groups, explain what the groups will be expected to do. Each group will act as a panel of experts which is attempting to plan the future of medical technology. The group's task is to accomplish as much as it can toward this goal and prepare a five-minute report on its progress. The only rigid requirement for the content of the report is that all members of the group agree on everything in the report.

Note: What you can expect students to accomplish in this activity depends to a large degree on the way you have shaped the assignment that led into this lesson. If in the assignment you directed students to write about a single aspect of the problem--for example, to describe the present situation of medical technology and what the students found desirable and undesirable about it--then all the groups will have to work in the same way. However, each group will be describing this situation from seven different points of view, not just one, as in the homework assignment. At the opposite extreme, you may have left the assignment completely open. If you did so, you can leave the groups' assignment open or place restrictions on it now; which you do should depend on how students have reacted to the open assignment.

How you organize the group work should reflect your own experience in conducting this kind of activity. You might wish to have each group elect a chairman; you might wish to appoint chairmen; or you might prefer to let each group evolve its own organization. You might wish to impose rules of debate to ensure that all students will be heard--for example, a time limit of a minute or two each time a student speaks, a requirement that no student speak a second time until all students have spoken once, or simple parliamentary procedure. With or without such rules, you should impress on students the requirement that every conclusion of the group should have the unanimous support of the group.

You may wish to structure the time. For example, you might give groups about two thirds of the class period for discussion and the remaining one third for preparing reports, or you might stop all group at ten-minute intervals to check on their progress. However you struc ture the time, be sure that the groups all start preparing their reports soon enough to finish by the time you have set for the end of group work.

Finally, you can augment the role-playing aspect of this activity if you think it desirable to do so. If each student is constantly aware of playing a role as an expert, it will not only help the student understand what it is like to be an expert, it may help the student to concentrate on the ideas he has picked up from the reading and developed in his homework writing. You can encourage this awareness by having each student prepare for himself a "nameplate"--a card, folded to stand, with his name and his "point of view" written on it--and asking groups to sit in circles so that all group members can see one another's nameplates. Note that students will probably find it easier to stay in the roles of experts if they are operating under "adult" rules, such as parliamentary procedure, than if they are subjected to "consciousness-raising" rules of debate (e.g., a requirement that each speaker correctly restate the preceding speaker's opinion before he states his own opinion) and frequent interruptions.

B. Group Work: During the group work you should try to avoid being drawn into the groups' discussions. Rather than attempting to make every group function perfectly, you should observe (and maybe take notes on) the things you see keeping groups from functioning well. There are several kinds of things you can look for. (1) Personal problems among your students may show up in groups. (2) Working under rules of debate or time restrictions or both may be new to some students, who may therefore be unable to function well in this group activity. (3) Role-playing will probably have some positive and some negative results for students. It may help them to see the points of view of others (in this case, the points of view of experts whose roles they are enacting), but the artificiality of the procedure may impede discussion. The students' responses to role-playing *per se* will be one topic of discussion in Lesson 16, when the students review this and other methods of inquiry they have been introduced to.

In addition to these things, you should be looking for responses to the interaction of points of view which is taking place in these groups. During the discussion in the next lesson you will be asking students for their thoughts on these seven points of view, and you may be able to stimulate their thoughts then by reminding them of things that happened when the groups were working. Watch for evidence that (1) representatives of different points of view have trouble understanding each other, (2) each member of the group thinks his point of view is the most important of all and (3) each member of the group has a rather narrow view of the problem on the basis of his own reading and preparation. At the same time, watch for evidence that (1) all seven points of view are related to one another, (2) the combination of two or more points of view (when "experts" are able to speak to each other) makes for a better understanding of the whole situation than either of the points of view alone, and (3) the group as a whole, if it is able to function as a whole, generates a new, higher-order "point of view"--a view of the whole human side of medical technology.

You will probably find that each group gives a fairly clear picture of one or more of these disadvantages and advantages. The more you are able to structure your observations of the groups' progress, the better able you will be to help students discuss and understand these things in the next lesson.

C. Assignment: Groups may be unable to complete their work before the end of the first class period. If that happens, you can ask students to keep working, as a homework assignment. (Each group may wish to assign particular tasks to its own members.) If the groups have been able to finish, ask students to write down their reflections on (1) role-playing as an aid to understanding other points of view, (2) any rules of debate or other structures the groups worked under, (3) the advantages and disadvantages of studying a problem from these seven points of view independently and then tryng to combine what has been learned into one view of the problem and (4) the advantages and disadvantages of studying a problem on the level of analysis of society, as opposed to the level of the individual, the family or the community. The third and fourth categories of observations are the most important as preparation for the next discussion, but the others are also important for students to think about.

D. Conclusion of Group Work (if necessary): If groups did not finish before the end of the first class period, give them a short time to finish at the beginning of the second period.

E. Reports: Each group should have five minutes to report. To ease the pain you may wish to preface the reports with the observation that the groups' task was essentially impossible; what will be interesting for other students to hear about is not only what progress the group made and what the group decided, but also what obstacles the group encountered in attempting to accomplish its task.

F. Discussion: Discussion should focus on the points of view and the level of analysis, not on the groups and their reports. The groups' reports will, of course, furnish the starting point, but the objective of the discussion should be to verbalize what the students have learned, through the group work, about these seven points of view and this level of analysis.

1. Points of View: Use your notes from the preceding class period to stimulate comment. The following suggested discussion questions may be useful.

a. What sorts of problems resulted from each group's being divided into seven "points of view"? (See Topic B above for some possibilities.)

b. What sorts of advantages resulted from each group's containing representatives of seven different points of view? (See Topic B for suggestions.)

c. What else would each group have needed, besides more time, in order to prepare a complete outline of a plan for the future of medical technology? (Students will probably be aware of a need for more information. The "point of view" reading didn't give them much to work with. Students are largely ignorant not only of medical technology, but also of the distribution of resources, allocation of reponsibility, structure and function of institutions, and so forth, in American society. You might wish to point out that in Biomedical Science students will be learning about medical technology, and in Biomedical Social Science they will be learning about American society from those seven points of view.)

d. How are these seven points of view related to the seven points of view on the story, "Emergency"? (The father was concerned about distribution of resources: he didn't have any resources. The admitting lady was concerned about allocation of responsibility. The clerical assistant was a student of institutions and the behavior of people who are parts of them--people like the admitting lady. The mother was concerned about shared ideas and traditions; her problem was that she did not share the ideas and traditions of American society in relation to medical care, and the American health workers clearly had no respect for the ideas and traditions she had grown up with. The child was an example of thinking, emotion and motivation in practice; he really had two health problems, bleeding and fear. The older doctor was concerned about interaction with environments; he was interested in the child's environment and how it affected the child's health. The intern was concerned with values; she faced a value dilemma, and she had to resolve it--to act was to resolve it one way, and not to act was to resolve it the other way.)

e. What points of view are omitted? If one understands things from all these seven points of view, as well as from the point of view of natural science, what is missing? What other viewpoints need to be considered, in addition to these seven, if one is to understand fully the human side of any problem? (This is an open question. Students may not be able to answer it at all, or they may have particular bones to pick in relation to the points of view that have been selected. These points of view are not intended to be exhaustive of human understanding. Students who feel strongly that another one should be added, should be heard. And, if you think the students' suggestions have merit and the students can follow through on them, you might add their points of view to the seven included here when they are used in later lessons.)

2. Level of Analysis: In these two lessons students have been asked for the first time in this course to consider a health-related problem on the level of the society. Students may find working on this level distasteful. A society is an abstraction: it exists in people's heads. It is, moreover, a very complicated abstraction. It is difficult, if not impossible, to understand. Some or all of your students may have identified this disadvantage of attempting to study a problem on this level of analysis.

At the same time, however, students should be aware that the society is none the less real, that it has real problems, many of them related to health, and that it does attempt to solve some of its problems. The society is most real, because most uniform, from the points of view of the economy (distribution of resources) and the polity, or government (allocation of responsibility). Largely because of mass media of communications, most Americans are aware of the society they belong to, of its problems and of its attempts to solve them.

The primary advantage of studying health problems on the level of analysis of society is that many health problems are influenced by the economic system and the political system that hold American society together. Whether such problems as controlling the use of medical technology, controlling pollution, training the right kinds of health workers in the right numbers, and so on, should be dealt with on this level is a separate question, and one that deserves attention. The fact is, however, that in this society as it is presently organized these health-related problems and many others are dealt with primarily on this level: they are not left up to individuals, to local or state government or to international agencies. All citizens, but particularly all citizens who work in health careers, can influence the ways in which their society goes about trying to solve these problems.

ASSIGNMENT:

There is no assignment.

LESSONS 12-15: HEALTH CAREERS

SYNOPSIS:

In these four lessons students do independent book research on a variety of health careers and report to the class on what they have learned. As a homework assignment, students read a review of the concepts introduced in lessons 1-15 and answer review questions.

OBJECTIVES:

The student will select a category of health careers he is interested in.

Within an assigned category the student will select a health career to study.

The student will describe the work in the chosen health career from at least four of the seven points of view introduced in previous lessons.

The student will describe the relationship of the chosen health career to each of four dimensions of health: attitudes, opinions and beliefs; technology; roles and relationships; and the causation, prevention, detection and treatment of disease.

The student will describe similarities and differences between the chosen health career and at least five other health careers that other students have studied.

SUPPLIES:

Books and pamphlets on health careers (see Advance Preparations, on following page)

STUDENT TEXT:

Health Careers

Questions about Health Careers

Review

ADVANCE PREPARATIONS:

During this sequence of lessons students will benefit from the presence in the classroom of any resources you can find which will provide information about a wide variety of health careers. Two kinds of resources are likely to be most helpful: books, and people.

People: As guest speakers and question-answerers you might consider inviting two kinds of people: a generalist, such as a career counselor, who is likely to have information about a variety of health careers; and a panel of specialists who, as a group, will be able to provide information about a variety of health careers. (For an indication of the range of careers students will be investigating, see "Health Careers," in the Student Text.)

Books: Any libraries that students have access to either during or after school hours should be considered as sources of information. With advance notice, a library may be able to help you assemble and place on special reserve a collection of books that students can use. Students should also be encouraged to use (and may need to be taught how to use) card catalogs.

In addition to library books, students will benefit from availability in the classroom of reference works and informational pamphlets, particularly for their first round of inquiry into the nature of the careers they are studying. Below you will find listed two very good resources which may or may not be available in libraries, but which you should be able to get into your classroom if you send for them early enough. The latest editions available at this writing are listed; more recent editions may be available to you.

In addition to the resources listed below, students may be able to use any or all information you have received from the professional associations, state agencies and other organizations listed in the Appendix, "Information on Health Careers," at the end of this Instructor's Manual.

American Medical Association, Horizons Unlimited: A Handbook Describing Rewarding Career Opportunities in Medicine and Allied Fields, 9th ed., 1970, American Medical Association, 535 N. Dearborn St., Chicago, Ill. 60610

U. S. Department of Labor, Manpower Administration, and U. S. Department of Health, Education, and Welfare, National Institutes of Health, in cooperation with the National Health Council, Health Careers Guidebook, 3rd ed., 1972, for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402. Price $2.25.

SUGGESTED TEACHING PROCEDURES:

Note: Four class periods have been alloted in which for students to research health careers and share the results of their research. These Suggested Teaching Procedures are in four parts, each part containing suggestions for one phase of this activity. Part A suggests ways of assigning students to careers. Part B suggests tasks you might set for the students. Part C describes things students might do in order to get information about the careers they are studying. Part D suggests ways in which students can share the results of their work. We recommend that you read all these suggestions in advance and tailor the four days' activities (more, if you think it advisable) to make the best possible use of the resources available to you and the class.

A. Assignment of Students to Careers: After briefly describing the activities students will be engaged in over the next four lessons, begin the process of assigning students to careers. You might begin by displaying a list of categories of health careers. The following list has the advantage of matching the categorization of careers in the Student Text. However, there is no generally accepted categorization of health careers, and you may find another system in one of your resources which will better serve the needs of your class.

1. basic science and engineering

community health services {
2. mental health services
3. social services
4. health educational and communication services
5. environmental health services
}

6. dental services
7. diagnostic and laboratory services
8. dietetic and nutritional services
9. health institutional and health services management
10. medical appliance technology and related services
11. medical and related services
12. nursing and related services
13. pharmaceutical and related services
14. rehabilitation and therapeutic services
15. vision, speech and hearing services

With your list of categories on display, ask each student to take out a sheet of paper and write down his name and the names of three health fields (from your list) he is most interested in working in. The three fields should be numbered: 1 for the first choice, 2 for the second choice and 3 for the third choice.

Students will probably want more information about these health fields. You can refer them immediately to "Health Careers," in the Student Text, for lists of occupations that fall into the various categories given above. Try to get students to make choices without too much discussion and delay. It will probably help if students are aware that they are not picking a specialization for life, but only helping you decide how to assign them research topics.

When all students have finished their "ballots," collect them and use them to assign students to categories of health careers. Divide the class as evenly as possible among the careers; in a class of 30 students you should ideally have two students assigned to each of the categories of careers.

(A relatively quick way to assign students is to establish 15 numbered stations along a wall or around a table, and have each student place his ballot at the station corresponding to his first choice. Then take the piles of more than two ballots and redistribute ballots, by second choices, among piles that have no ballots or only one ballot. Then redistribute by third choices. If some categories are still not covered, make some arbitrary decisions.)

Finally, announce the assignments and ask the students to get together with the other students who have been assigned to the same category. Within each category, students should consult "Health Careers," in the Student Text, and decide which career each student will study. (The only reason they need to consult is to avoid two or more students' studying the same career.) Their primary criterion in selecting a career to study should be their own interest in the career. Another criterion they might consider is the availability of information about the careers. Students might check in indexes or tables of contents of resource materials available in the classroom to see whether the careers they are interested in are represented. In general, students should avoid careers they have never heard of and stick to those whose names, at least, are familiar. Each student should report to you on the career he has selected.

B. Description of the Research Task: Before students start to work, describe their task. Each student is to learn as much as possible about what it would be like for him, as an individual, to work in the career he is studying. Students should not be expected to dig out tables of statistics, lists of medical schools and the like. They might look at statistics, but only for the purpose of judging such things as how much money they might make, how easy it would be for them to find a job or how far they might have to travel to get the right training.

Keeping strictly to this individual level of analysis, each student should attempt to learn as much as possible about "his" health career. "Questions about Health Careers," in the Student Text, will help students with this task. This list of questions includes some representing each of the seven points of view that have been introduced in previous lessons. It also includes some that bear on each of four "dimensions of health": technology; attitudes, opinions and beliefs; roles and relationships; and the causation, prevention, detection and treatment of disease.

In addition to the questions listed in the Student Text, the student or the class as a whole might wish to introduce other questions, other points of view and other dimensions of health. Whether this is done is entirely up to you and the students. However, if the class or individual students have expressed the opinion that the seven points of view previously discussed are not enough, now is the time to introduce new ones that the students believe are important.

Having described the task in general terms, you should give the students some idea what research methods they will be employing and what sort of result you expect them to produce. Parts C and D below offer suggestions.

C. Research on Careers: The following are several ways in which you might have students learn about the careers they have chosen to study.

1. Book Work in the Classroom: The class might spend all or part of a class period reading (and taking notes) from the resource materials you have assembled. See the Advance Preparations section, preceding these Suggested Teaching Procedures, for references.

2. Library Work: The class might spend one class period or more in the school library. The time could be used to assess students' library skills and, if necessary, to introduce students to the use of card catalogs and the location of things in the library. Don't overlook encyclopedias as a potential source of information.

3. Outside Book and Library Work: This research project can be used for as many as three homework assignments (depending on how many days you allot to the research part of this sequence). Students should be encouraged to use public libraries to find information about the careers they are studying.

4. Guest Speakers or Panel: The class might spend one class period talking with a person who can give them reliable information. One candidate is a school counselor. You might want the counselor to give a talk about health careers, but the bulk of the time he is in the classroom should be devoted to answering students' questions.

You might wish to invite a panel of health professionals for the students to question. It would be unfair to some students if you invited speakers who knew about only a few of the career categories the class is studying. However, if you can assemble a panel that fairly well covers the gamut of health careers then you will have provided the students with an irreplaceable fund of information.

Obviously, students will be able to make the best use of guest speakers if they have already done some book research and thought a bit about the questions they are going to ask. If you can schedule a day for a guest speaker or speakers in advance, the homework assignment for the preceding night should be to prepare questions for the speaker(s).

5. Outside Interviews: Students who have personal relationships with health professionals might be able to interview them, or to introduce them to other students who might want to interview them. You shouldn't send the class swarming out upon an unsuspecting professional community, but you might encourage students to make use of the connections they have.

D. The Results of the Research: There are any number of ways in which students can present their results to one another (and to you). Some of the possibilities are listed below. You will probably be able to think of others. In general, you should try to arrange the assignment so that (1) you can evaluate each student's work and (2) each student's work can be made available to the whole class.

1. Written Reports: Each student might prepare a written report on the career he has studied. Length and format requirements are infinitely variable. Note that, while writing makes it easy for you to assess the students' work, it makes it difficult for other students to have access to it. We suggest that you use a short writing assignment, in combination with one or more other assignments.

2. Panel Discussions: You might form one or more panels of students, each panel including representatives of several career categories, and ask each panel to discuss similarities and differences among the careers the panel members have researched. There are several ways of forming panels.

a. Divide Careers by Dimensions of Health: You might divide the career categories into three groups according to the major concerns of the persons who work in the careers. The suggested division shown below is highly arbitrary--no single health career is exclusively concerned with only one dimension of health --but this division will produce equal-sized panels. (There is no need to discuss the basis on which the panels were formed.) (1) One panel might represent careers in which workers are concerned with technology, including both the development of new technology and the use and control of existing technology; categories 1, 7, 10, 13 and possibly 9 might be used. (2) Another panel might represent careers in which workers are concerned with the prevention and treatment of disease, either in individuals or in communities; categories 5, 6, 8, 11 and 15 might be included. (3) A third panel might represent careers concerned with the patient or client more as a person than as an organism; categories 2, 3, 12, 14 and possibly 9 might be used.

b. Divide Careers by Contact with Clients: You might form one panel representing careers in which workers are likely to have frequent contact with sick people (selected from categories 2, 3, 6, 8, 11, 12, 14, and 15) and another panel representing careers in which workers are less likely to contact sick people (mainly from categories 1, 4, 5, 7, 8, 9, 10 and 13). Alternatively, you might form panels in which half the members of each panel represent high-contact careers and the other half represent low-contact careers.

In preparation for a panel discussion, the panelists should meet in advance of their public presentation to the class. They should decide in advance what they can interestingly talk about (what similarities and differences all panelists can address) and how they will organize their presentation. When the panel appears before the class, panelists should have the opportunity to answer questions from the class.

3. Reports According to Career Categories: You might form 15 small groups, each representing one career category. Each group might do any of several things: (1) prepare a written group report, to be combined with other groups' reports into a "career book"; (2) prepare an oral report and present it to the class; (3) prepare a visual display illustrating what it is like to work in careers in this category; (4) prepare a large-scale, written summary of the career category, in a format common to all groups, the summaries to be displayed around the room so that students can view them all and draw their own conclusions about similarities and differences among the career categories.

ASSIGNMENT:

At the conclusion of the sequence of lessons in which students research health careers, assign the reading of "Review," in the Student Text. The next lesson consists of a discussion in which the class reviews the concepts and methods introduced in the unit to date.

Note that nearly half the material in "Review" consists of questions. There are more questions in the reading than one student can reasonably be expected to answer in one homework assignment, though the text of the reading is not very long. You might assign the whole text of the reading to all students, and then either select a few questions that you think will be most useful and assign them to all students, or divide the questions among the students. Questions not used in the homework assignment can, of course, be used in the next lesson's discussion along with the questions included in the Suggested Teaching procedures for the next lesson.

LESSON 16: REVIEW

SYNOPSIS:

This lesson has been set aside for review of lesson 1-15. The time may be used in discussion, writing or a combination of the two. As a homework assignment, students read about the next method of inquiry that will be introduced.

OBJECTIVES:

Given a description of a health problem, the student will identify at least one level of analysis on which the problem can be studied and state at least one reason for choosing that level of analysis.

Given a description of a health problem, the student will identify at least one dimension of health included in the problem and describe the relationship between the problem and that dimension of health.

Given a description of a health problem, the student will identify at least one point of view from which the problem might be studied and describe the problem from that point of view.

Given a description of a health problem, the student will identify at least one method of inquiry that can be used to learn more about the problem and describe in outline form the steps he would use in applying that method.

Given a description of a health problem, the student will identify at least one aspect of the problem that could be studied from a natural-science point of view (e.g., physics, chemistry, biology) and at least one aspect of the problem that could be studied from a social-science point of view (e.g., economics, politics, culture, psychology).

STUDENT TEXT:

Reading: The Unstructured Interview

SUGGESTED TEACHING PROCEDURES:

Conduct a review of lessons 1-15 as you see fit. Part or all of the class period may be used for evaluation. The questions in the "Review" section of the Student Text can be used for writing or discussion or both.

The following is divided into the same subheads as the "Review" section of the Student Text. Each part below includes some ideas about the concepts and methods introduced so far which are supplementary to the information in the Student Text and which you might wish to discuss with the students. Each part below also includes some suggested questions. These are on a more abstract level than those in the Student Text, and probably should not be introduced until students have satisfactorily answered more concrete questions such as those in the Student Text.

A. Levels of Analysis: People's thinking constantly switches from one level of analysis to another. The only justification for talking explicitly about levels of analysis is that an awareness of which level one is operating on can sometimes help one to avoid mistakes. Mistakes often occur when we use information from one level of analysis to draw a conclusion on a different level of analysis. For example, we might have a generalization about a large group of people which we have reason to believe is true of the group ("Americans are wealthy," for example). If we assume that the same statement is true of a given individual who is a member of that group, we may be mistaken.

Similarly, we may begin with a statement about an individual ("Mr. Schmidt is cruel," for example). If we generalize and say "All Germans (or jewelers, or Catholics, or members of whatever other group Mr. Schmidt may belong to) are cruel," we may be mistaken again.

Questions:

1. Define "health" at the level of the individual.

2. Define "health" at the level of the society.

3. Speaking as a person who wants to stay healthy and is vulnerable to all sorts of diseases, which of the levels of analysis you have studied (individual, family, community, society) do you think is most important? Why?

4. Speaking as a potential worker in a health career, which level of analysis do you think is most important? Why?

5. Speaking as a citizen in a democratically governed society, which level of analysis do you think is most important? Why?

B. Dimensions of Health: One reason for introducing the concept of dimensions of health is that a complicated health problem (on any level of analysis) is often easier to understand and to solve if one first breaks it down into parts and studies one part at a time, then studies the interrelations among the parts.

Another reason for introducing this concept is to impress on the students the fact that virtually every health problem (on every level of analysis) involves more than a defective bodily machine that needs to be fixed. Two of the named dimensions--(1) technology and (2) the causation, prevention, detection and treatment of disease--cover the "defective machine" approach fairly completely. But each of these dimensions also includes (to different degrees in different cases) social processes. The other two dimensions--(3) roles and relationships and (4) opinions, attitudes and beliefs about health--are not so directly related to the "defective machine" approach, but both are directly related (again, to different degrees, depending on the case) to health, disease and health care.

Questions:

1. Describe a situation (real or imaginary) in which people's beliefs about health care cause a healer and a patient to adopt particular roles, to enter a particular kind of relationship with each other.

2. Describe a situation in which the use of medical technology--an instrument or method used in treatment of disease--causes a healer and a patient to adopt particular roles to enter a particular kind of relationship.

3. Describe a situation in which the use of medical technology might cause disease.

4. Describe a situation in which a certain pattern of roles and relationships among healer, patient and family members makes it difficult or impossible to cure a particular disease.

5. Describe a situation in which the use of medical technology causes people to have particular beliefs about health care.

6. Describe a situation in which people's beliefs might cause disease or make it hard to cure disease.

C. Points of View: It is a major objective of this course to help students feel comfortable with the viewpoints of five social science disciplines and to help them become aware of ethical problems and ecological relationships, particularly as these affect health, disease and health care. The rationale behind this objective is that a citizen should be able to adopt any one of these viewpoints for the purpose of understanding his social situation; should be able to understand information presented by others who adopt these viewpoints (i.e., social scientists, philosophers and ecologists); and should be able to assess the trustworthiness of information from these sources. It is not necessary that the student eventually become either a health worker or a social scientist in order to use these viewpoints; the guiding assumption behind our treatment of these viewpoints is that the student is and will continue to be a citizen in a large, complex and rapidly changing society.

Questions:

1. How is it possible for the distribution of resources to cause a health problem on the community level of analysis? Give an example, either one you have heard or read about or one you make up.

2. On the level of analysis of the society, who should hold the authority to make laws affecting health care? Why?

3. On the community level of analysis, which of the five institutions (economy, polity, education, family, religion) has the

greatest influence on the health of persons in your community? Which has the least influence on the health of persons in your community?

4. On the community level of analysis, how is it possible for a conflict between two cultures to cause a health problem? Give an example, either one you have heard or read about or one you make up.

5. On the individual level of analysis, what emotions might patients have that would make it difficult for them to remain healthy or to get well if they are sick? Give examples. (Concentrate on diseases of the body, not on mental illness. Think about how emotional problems might arise from physical illness and complicate the treatment process.)

6. On the social level of analysis, what values do you think most Americans share which might make it difficult for some Americans to get health care? Give examples.

7. On the community level of analysis, what conditions in your environment might cause disease? How would you describe the relationships between the people in your community and their non-human environment? Is the environment generally healthful for the people?

D. Methods of Inquiry: In this course students will be introduced to many methods of inquiry that health workers can use to study the health problems they are supposed to solve. These same methods are also used by social scientists to get information about many other aspects of social life--much of it useful to citizens in a democratically governed society if not especially useful to health workers. There are two objectives for students in studying these methods of inquiry. One is to learn how to use the methods, and the other is to learn the limitations of the methods.

1. Participant Observation: Anyone can use this method to investigate a particular aspect of his day-to-day social situation. One disadvantage of this method is that it is completely unstructured inquiry: the observer necessarily observes whatever chance brings his way, which may or may not turn out to be relevant to what he wanted to know. Another disadvantage is that it is very difficult to observe a familiar situation dispassionately. A third is that it is difficult as well as ethically questionable to observe people without tipping them off that they are being observed.

2. Questionnaire Survey: One advantage of the questionnair is that it enables one to form conclusions about a population without having to interview every member of the population. Another advantag is that the inquiry is highly structured: the inquirer can ask exact the questions he wants answers to and he can provide a list of answer for respondents to choose from. A disadvantage is that, if one is not very careful, one's sample may not be representative of the population it is drawn from. Another disadvantage is that, if the inqui is too highly structured, the inquirer will miss things that he might have been able to detect through less structured inquiry.

3. Role-Playing: The major advantage of role-playing as a method of inquiry is that it enables people to see things from other people's points of view. The major disadvantage is that role-players may only act out what they think other people are like and therefore never find out anything about what it is like to be those other people.

4. Book Research: Most students need no introduction to this method of inquiry. However, preparation for a health career often requires a great deal of reading, and Biomedical students may be expected to benefit greatly from any help you can give them with book-research skills. Research and writing assignments, using the methods you have found most productive, are recommended as a complement to this course--as a means of helping students investigate matters they think need more attention than we give them here, as well as helping them develop skills.

Questions:

1. On what level(s) of analysis is participant observation likely to be most useful? Give examples of health-related problems you might investigate with this method.

2. In what dimension(s) of health is survey research likely to be most useful? Give examples of health-related problems you might investigate with this method.

3. How might role-playing be used in a health care delivery organization, such as a hospital or clinic, to improve health care? Describe particular situations in which it might be used--who would participate, what roles they would play and what you would expect them to learn.

4. What are the advantages and the disadvantages of book research as a method of inquiry?

E. Natural Science: It is important in this first unit to establish the attitude that natural science and social science are complementary ways of studying health, disease and health care. The questions in the "Natural Science" part of the "Review" section in the Student Text are intended to illustrate that neither a natural-science nor a social-science viewpoint gives a complete view of what is happening in a health situation.

Questions:

1. Why is it not a good idea to ignore the natural-science side (e.g., physics, chemistry, biology) of the relationship between people and their environment?

2. Why is it not a good idea to ignore the social-science side (e.g., economics, politics, culture, psychology) of the relationship between people and their environment?

3. Describe some important sources of uncertainty (1) in

the observation and measurement of physical objects and processes and (2) in the observation and measurement of human social behavior.

ASSIGNMENT:

Assign the reading, "The Unstructured Interview," in the Student Text. The reading introduces the topic of the next two lessons.

LESSON 17: PREPARATION FOR UNSTRUCTURED INTERVIEWS

SYNOPSIS:

After discussing the homework reading on unstructured interviews, the class, through discussion, selects a topic and a group of informants and develops questions to use in interviewing the informants about the topic. A practice interview is conducted and discussed in class. As a homework assignment, each student conducts an unstructured interview with one informant. Note: This lesson may take more than one class period, depending on how it is taught.

OBJECTIVES:

The student will describe the differences between the kinds of situations appropriate for inquiry by participant observation, unstructured interview and questionnaire survey.

The student will describe the differences between the kinds of information provided by these three methods of inquiry.

The student will write at least one question appropriate for unstructured interviews of a given group of informants about a given topic.

The student will conduct an unstructured interview with one informant and record the informant's responses.

SUGGESTED TEACHING PROCEDURES:

A. Discussion of the Homework Reading: The homework reading describes a method of inquiry, and discussion of it might focus on the similarities and differences between this method and the other two methods the students have used which are similar to it. Participant observation is even more unstructured than the "unstructured" interview, since it does not use any questions at all; the questionnaire survey is more highly structured in that it does not allow the inquirer to follow the respondent's lead.

One important thing for students to recognize about these three methods is that they are appropriate for different kinds of situations. If one wants to observe a situation in which one is a participant (or can become accepted as a participant), and if one does not want to influence people's behavior by asking questions, then one uses participant observation. If one wants people's responses to particular questions or ideas, but does not want to use follow-up, or probing, questions to inquire more deeply into their responses, then one uses a questionnaire. (In order to use a questionnaire the inquirer does not have to become accepted as a participant in the situation he works in, but he does have to be able to communicate his questions and ideas clearly.) Finally, if one wants to know what people have to say about some general topic and wants to be able to probe into the thoughts behind people's responses, one uses the unstructured interview. (The unstructured interview is particularly useful in situations where the informants' responses are unpredictable and the inquirer therefore needs to be flexible, to decide "on the spot" what kinds of particular questions to ask of his informants.)

Another important thing for students to recognize about these three methods is that they yield different kinds of information. Participant observation, as the students know, yields little more than a list of observed behaviors and recorded comments, which may show very little order and which may have little or nothing to do with the topic the inquirer is interested in. A questionnaire survey, at the opposite extreme, yields information that is ordered in advance by the questions included on the questionnaire and, in the case of closed questions, by the lists of answers respondents are asked to choose from. (Open questions are used on questionnaires too, but, as the students have discovered, the responses to them are difficult to tabulate, and for that reason closed questions are preferred as questionnaire items.) Finally, unstructured interviews yield information which is somewhat ordered, simply because it was given in response to questions about the general topic the inquirer was investigating, but which might--if the inquirer was skillful in his use of probing questions--reveal an order that existed in the informants' minds even if it did not occur to the inquirer until after he had conducted his interviews.

B. Discussion of the Assignment: Inform students that they will be asked to conduct unstructured interviews on a health-related topic. During the remainder of this period the class will discuss (1) the topic to be investigated, (2) the informants to be interviewed and (3) the questions to be asked. In the next lesson the class will go over the results of the interviews to see what can be determined from them.

How you conduct the rest of this class session depends on the extent to which you use the topic, questions and informants suggested below. The class can spend its time either trying to improve on the suggestions given here, trying to replace them with others or trying to produce their own suggestions from scratch, without considering the ideas given below. The more students do for themselves, the more they will learn about this method of inquiry.

1. A Topic for Investigation: The topic should be health-related. It should be a matter of ideas, opinions, values, beliefs, knowledge, experience--i.e., something informants can give direct information about, verbally. It should be a topic on which informants are likely to have somewhat unpredictable ideas; students (i.e., inquirers) should find themselves having to understand ideas that might be new to them, and to understand these ideas the way the informants understand them.

A topic students might inquire about is whether people think emotional stress can cause physical symptoms. The Background Information section, following these Suggested Teaching Procedures, presents a brief argument in favor of this question as a topic of interest to Biomedical students. In brief, there is some evidence that, for the majority of people, emotional stress can precipitate episodes of physical illness. People who are aware of this possibility might use the awareness to protect their health. When they are going through periods of emotional stress, they might seek to reduce the hazard of physical illness by taking precautions against the other, more easily avoidable factors that can contribute to illness, such as exposure to infectious diseases, poor diet, lack of rest and lack of exercise. Of course, people might also seek to protect their health by avoiding situations that expose them to emotional stress unnecessarily.

By way of introducing this subject to the class, you might conduct a mass unstructured interview of your own: ask the students whether they believe emotional stress can cause physical symptoms, whether they know of instances that confirm this idea, whether they have heard of any methods of promoting health by avoiding emotional stress, and so on. During such a discussion you might fill out the idea of "emotional stress." It can result from "happy" as well as "sad" emotional experiences--getting married as well as getting divorced, graduating as well as flunking out, etc. You might also illustrate the possibility of following up on negative responses to the question. Some informants will probably never have thought of the possibility; others will probably say they don't believe it. If students give responses of these kinds, you can follow up by asking why they don't believe it, whether they know of any evidence that it's impossible, whether they believe mind and body are completely separate and if so why, and so forth.

2. Informants: Each student should interview one informant. In order to make the interview relatively easy for your students, the informants should be people the students know well. Unstructured interviewing is usually done with strangers, and often in foreign or exotic surroundings. However, students will probably prefer to stick to familiar situations and faces.

We suggest that students interview friends their own age. By interviewing friends rather than family members, and by interviewing people in a given, relatively narrow age group, the students will be focusing their inquiry on a particular segment of the American population (and of the population of your community). Questions can be tailored to fit this group of informants.

3. Questions: Questions should be designed to elicit information from a particular class of informants, about a particular subject, without giving the informants information about what they are expected to say--only about what they are being asked to talk about.

When the class discusses questions that should be asked, each student should have writing materials at hand so that he can write down the questions the class agrees are useful. When this part of the discussion is over, all students should have the same list of questions. The list should not be very long (the list below might be considered about the right length). Students should be aware that they are not required to ask every question on their list; they are to use the questions as necessary to get informants to talk. If an informant goes off on a tangent--but is still talking about the general topic the class is investigating--then the inquirer should abandon his questions and follow the informant.

If students interview friends their own age about the question whether emotional stress can cause physical symptoms, then the following kinds of questions might be considered. (The questions should be stated in terms that the students think their respondents will understand.)

a. Do you think emotional stress can cause physical symptoms?

b. Has anyone you know ever had physical symptoms that they thought were brought on by emotional stress?

c. If so, what kinds of symptoms? What kind of stress?

d. Do you think this is more likely to happen to people in a particular age group or stage of life?

e. Do you think it is more likely to happen to people of one sex than to people of the other?

f. Have you heard or read about any methods or techniques for coping with emotional stress which might prevent the appearance of physical symptoms?

g. If so, do you know of any evidence that such methods work?

C. Practice Interview: When the class has settled on a short list of questions, ask for a volunteer to interview you on this subject. Suggest that the student play the role of an anthropologist from another country who is investigating Americans' attitudes, opinions and beliefs about health. Point out that the class has not developed any list of follow-up, or probing, questions, and that the interviewer should make them up as he goes along. Reemphasize that probing questions are intended to get more information about something the informant has said, but should not give the informant any hints about the inquirer's opinions. "That sounds pretty silly, where did you hear that?" is a poor probing question. So is, "That sounds like a great idea. Tell me all about it!" Good probing questions ask things like, "Do you remember where you heard that?" and, "Can you tell me more about that?" and, "You mentioned biofeedback (or whatever), can you tell me what that means?"

D. Discussion of Practice Interview: There are three things to discuss after the practice interview: the opening questions, the probing questions and the use of the "foreign anthropologist" role-playing.

1. Students may feel, after the practice interview, that some of the questions on the class' list need to be changed or replaced, or that additional questions need to be asked.

2. The class should discuss the probing questions that were used during the practice interview, decide which ones are likely to be useful, which ones may have revealed too much of the inquirer's point of view, and what additional probing questions might be used.

3. Students might consider using a similar role-playing situation when interviewing their informants. Particularly if students are interviewing friends their own age, such role-playing may make it easier for both the inquirers and their informants to handle the artificiality of the situation.

E. Preparation for Interviewing: Finally, give the students practical advice as you think necessary. Some of the things you might want to mention are listed below.

1. Prepare something to write on. The inquirer might take along some sheets of paper with the class' questions already listed on them, with space between the questions for note-taking. He might also take a few sheets of blank paper for note-taking on other things the informant has to say.

2. Choose a friendly informant. If the informant knows the inquirer and is favorably disposed toward him, then the inquirer is less likely to alienate the informant by asking all these questions.

3. Don't be rushed. The inquirer and informant should both feel that they have plenty of time to talk. If they feel hurried, they might stay out of whole areas of discussion that they would otherwise get into.

4. Take notes, but don't spend all your time writing. The inquirer should jot down key words and phrases that will remind him of what the informant said. After the interview, the inquirer can go over his notes and write down a fuller account of the informant's responses. The sooner after the interview he does this, the less he will forget.

5. Protect the privacy of the informant and others. If an informant discusses his own health problems or those of others--especially others who might be known to members of the class--then the inquirer must be careful not to record or to report information that might invade the privacy of these people. Even health problems that the informant or the inquirer does not think are embarrassing may be considered by others to be too private for discussion in a school classroom. The inquirer should not record or report any information that might enable others to identify the person who had the health problem being described.

ASSIGNMENT:

Each student is to conduct an unstructured interview with one informant from the group agreed on by the class (e.g., students' friends their own age), about the topic agreed on by the class (e.g., whether informants think emotional stress can cause physical symptoms), using the questions developed in class. Each student is to bring his interview notes to the next class meeting, and be prepared to discuss his informant's answers.

BACKGROUND INFORMATION:

The following information is based on an article by Lawrence E. Hinkle, Jr., and Harold G. Wolff, "Ecologic Investigations of the Relationship between Illness, Life Experiences and the Social Environment" (Annals of Internal Medicine, Vol. 49, No. 6, December, 1958).

During the 1950's the authors investigated the medical and personal histories of people in five groups: 1,700 semiskilled American working women, 1,527 skilled American working men, 100 Chinese graduate students and professional people, 76 Hungarian refugees and 132 recent graduates of American colleges.

The investigators found the following things.

1. Within each group, when the subjects were "lined up" according to the number of "episodes of illness" experienced in a 20-year period, 25% of the individuals in the group were found to have experienced about 50% of the episodes of illness. At the other end of the continuum, 25% of the individuals in each group had experienced fewer than 10% of the episodes. In short, some people get sick more often than others.

2. Within each group, the more episodes of illness an individual had, the more organ systems were involved in the episodes. A person who had many illnesses had many kinds of illnesses: disorders of mood and thought, skin, teeth, bones and joints, gastrointestinal system, etc. The findings do not bear out the idea that a person may be ill a lot with one particular weak organ or system, such as a "bad stomach." Rather, a person who is ill a lot is likely to be ill in a lot of ways.

3. Within each group, over half the individuals showed "clusters" of illness distributed over their lifetimes. (The actual percentages ranged from 56% for the Hungarian refugees to 91% for the American working women.) For these people, illness episodes occurred with great frequency at certain times of their lives, separated by periods of relative good health. Within each cluster, the individual was likely to have several different kinds of illness--not a cluster of illnesses all related to one organ system.

4. For the individual who showed clusters of illness, the vast majority of clusters occurred at times when the individual was living in situations that he or she found emotionally distressing. For one American working man, for example, the clusters of illness occurred when he was a child and his parents were constantly fighting; when he was a teenager, going to night school and also working; when he was a young adult supporting not only himself but also his

parents and siblings; when he got married; and when his wife and daughters were ill, his parents were dying and he was going deeply into debt.

The researchers concluded that, for many people, illnesses of all kinds (physical as well as mental and emotional) can be brought on, precipitated or aggravated by situations that are, for those individuals, emotionally distressing. It is important to note (1) that a pleasant experience may produce as much emotional stress as an unpleasant one, (2) that a situation which causes one person great emotional stress might not faze another person and (3) that emotional stress is not considered to be the sole causative agent in any of the disorders that occur. That is, one cannot simply look at a person's situation and predict with confidence that the person is about to get sick; one must consider the individual's personality, and also such factors as his exposure to infectious disease, his physical fitness, his diet, the amount of rest he gets, the degree to which his body has already been "softened up" by previous disease episodes and so on. With these reservations in mind, however, one might still conclude that if a person feels himself to be under emotional stress, he might be more likely to get sick than he would be if the emotional stress were not there.

In many cultures, emotional stress is recognized as a primary cause of illness and death: people fall physically ill and sometimes die from shame, frustration, anger, love and so on. Americans tend to look more for physical causes of physical disease and to ignore or downplay the role of their emotions in affecting physical processes in their bodies.

LESSON 18: USING THE RESULTS OF UNSTRUCTURED INTERVIEWS

SYNOPSIS:

In this lesson students share their informants' responses, organize the information they have gathered, generalize about the ideas of the informants as a group and discuss the possibility of generalizing from these informants to some larger population. These activities may occupy more than one class period. As a homework assignment, students read data and answer questions on the possible relationship between personality and social setting, on the one hand, and coronary heart disease, on the other hand.

OBJECTIVES:

The student will describe an informant's responses to the class' questions, obtained in an unstructured interview.

The student will state at least one generalization about the class' informants as a group, derived from the informants' responses to the class' questions.

The student will identify a population to which he thinks it is possible to generalize from the respondents and state why he thinks the respondents are a representative sample of this population; or the student will state why he thinks the respondents are not a representative sample of any larger population.

The student will identify at least one advantage and at least one disadvantage of using the unstructured interview as opposed to using either participant observation or a questionnaire survey.

STUDENT TEXT:

Data on Coronary Heart Disease

SUGGESTED TEACHING PROCEDURES:

A. Starting the Discussion: You might begin with questions such as, "Did any of the informants say things that surprised you?" or, "Did any of the informants seem to have a point of view which we did not consider when we were thinking up questions?" If there are affirmative answers to questions of this sort, you should take them as indications that there is something in the responses which the class can discover by seeking order in the responses, and which might be obscured if the class imposes its own order from the outset.

B. Sharing Informants' Answers: Proceed to get an indication of the range of answers to the class' questions. You can do this in either of two ways, discussed separately below, depending on whether you want to seek order in the answers or to impose it on them. During this part of the discussion students should take notes, which they will need to refer to during the next part.

1. Seeking Order: If there appears to be unexpected information in the informants' responses, explore the range of answers by having each student relate briefly what his informant had to say. This method is time consuming, but it avoids imposing on the answers the order inherent in the class' questions and it may encourage students to seek order or sense in the responses themselves.

2. Imposing Order: If the respondents' answers do not appear to contain any surprises, you might simply ask for informants' responses to one question at a time. When all students agree that the entire range of answers to one question has been revealed, ask about the second question. Continue through the questions in this fashion until students have discussed all of them. This method imposes the class' order on the informants' ideas, but it is faster than the other method.

C. Ordering Information: The students should attempt to categorize the information they have obtained. This is the first time a categorizing activity has been suggested in this unit, and you should adapt your own teaching strategies to the material. There are essentially two ways to organize the information, corresponding to the two ways of reviewing it suggested in Part B above.

1. Seeking Order in the Responses: If the class has not discussed informants' answers one question at a time, it may be possible to identify categories inherent in the responses. The Background Information section following these Suggested Teaching Procedures indicates some of the kinds of categories that might be found in the responses.

2. Imposing Order on the Responses: If you have discussed the responses one question at a time, the class can attempt to categorize the answers under each question.

D. Generalizing about the Informants' Responses: When the class has categorized the responses, ask what, if anything, can be concluded about the attitudes, opinions or beliefs of the informants as a group. Students should be able to state that the informants all (or nearly all) agree on some idea, that they are divided into a few distinguishable positions on some question or that they hold many and various opinions on some subject. If there is agreement or a division into a few distinguishable positions, students should be able to characterize the ideas involved: "The informants as a group agree that emotional stress is more likely to cause physical symptoms in teenagers than in younger or older people," or, "The informants are divided on the question whether emotional stress is more likely to cause physical symptoms in one sex than in another: some think girls are more likely to have this problem, but others think both sexes have this problem." If there is a question on which informants hold a great variety of views, then students should be able to characterize the subject of disagreement and the range of variation of opinion: "Informants disagree on the efficacy of methods that are used to reduce emotional stress. Some are convinced that meditation is 100% effective; some think drugs are effective sometimes; some think the best thing is to stay cool and avoid trouble; some think it is impossible to avoid stress; some have no clear opinion."

E. Generalization from the Informants: Ask the class whether the generalizations that have just been drawn can be applied to any group larger than "the informants." Can the students safely say, on the basis of their interviews, that these same generalizations are probably true of all students in their school? Of all people that age who belong to a particular ethnic group or have some other identifiable characteristic (assuming that the informants share some such characteristic--living in the city, living in the country, being relatively wealthy, etc.)? Are these conclusions true of all teenagers in the U.S.? Of all Americans? Of all teenagers in the world? Of everybody in the world?

The objective of this line of questioning is, of course, to get students to think about reasons why the conclusions might not apply. There may be sufficient variety just among the students in your own school that students will be unable to generalize even that far. (To point out the difficulty of generalizing from these interviews, you might ask students to contrast their interviews with an equal number of unstructured interviews conducted in a village where everyone knew everyone else intimately and all informants agreed on everything the inquirers asked them about, where ways from outside the village had not penetrated and won any adherents, and where the existing ways were the same ways that had existed two or three generations earlier.)

F. The Usefulness and Limitations of the Unstructured Interview: Encourage students to reflect on what this method of inquiry is good for. Their own experience is likely to have exposed them to some of the method's limitations. It may also have revealed to them some of its advantages over other methods of inquiry. Students should be encouraged to criticize the reading, "The Unstructured Interview," in so far as it does not accord with their own observations, and to verbalize their own observations as to the worth of this method of inquiry.

ASSIGNMENT:

Assign the reading, "Data on Coronary Heart Disease," in the Student Text. The reading is followed by nine problems. We recommend that you assign the last two problems to all students, and divide the first seven problems evenly among the class. This allotment can be used to divide the class into seven groups in the next lesson. Note that the assignment includes a table of data, which students may find confusing. Avoid explaining the table to them at this time; let them try to figure it out for themselves.

BACKGROUND INFORMATION:

How the informants' responses can be categorized depends entirely on the content of the responses. Below are descriptions of three kinds of categories that might appear, either alone or in combination, in the responses. There may, of course, be many others.

1. The class might have elicited several different descriptions of how mental or emotional processes and physical processes are related. Some informants might have said that psychic and physical processes are not related. Some might have said that all physical illness proceeds from some underlying mental, emotional or spiritual dysfunction. Others might have taken the contrary view, that all psychic processes are merely reflections of underlying physical processes. Some might have said that psychic and physical processes both affect each other. Ideas such as these can be used as major categories.

2. The class might have elicited descriptions of several methods that people use to stay healthy, possibly including some that indicate greater dependence on psychic processes (e.g., prayer, meditation, psychotherapy, the use of drugs, the conscious practice of avoiding emotionally stressful situations) and others that show dependence on physical processes (e.g., regular exercise, diet, avoiding people with infectious diseases). It might be possible to categorize these methods according to the sort of relationship they imply between psychic and physical processes; or it might be possible to use the methods themselves as major categories for organizing other ideas.

3. The class might have elicited several reasons why (in the informants' views) emotional stress cannot cause physical symptoms. These reasons might be categorized according to the relationships they imply between psychic and physical processes; or the reasons might serve as major categories.

LESSON 19: USING DATA MANIPULATION

SYNOPSIS:

Students discuss their answers to homework problems, using given data to formulate ideas about possible psychosocial causes of coronary heart disease. As a homework assignment, students write about data manipulation as a method of inquiry and about personality and social factors that may contribute to CHD.

OBJECTIVES:

Given data comparing two groups of people on several variables, the student will identify those variables on which the two groups differ.

Given a description of a variable on which two groups differ, the student will suggest a possible causal relationship between this difference and the fact that members of one group have CHD and members of the other group don't.

The student will describe at least one advantage and at least one disadvantage of data manipulation using other people's data, as opposed to data manipulation using one's own data and research using other people's information but not using numerical data.

The student will describe a health problem related to coronary heart disease on a particular level of analysis and will describe possible solutions to this problem suggested by at least three of seven given points of view.

STUDENT TEXT:

CHD as a Social Disease

SUGGESTED TEACHING PROCEDURES:

A. Discussion of the Homework Reading: Begin the class with a discussion of the information about coronary heart disease (CHD) given in the first two parts of the reading, "Data about Coronary Heart Disease," in the Student Text.

1. What Is CHD? The anatomical and physiological information in this section of the reading is sparse, but it should be sufficient to make the point that CHD manifests itself in the complete or partial plugging of the arteries that supply blood to the heart muscle, and

that the plugging is most often caused, directly or indirectly, by deposits in the inside walls of these arteries. Students should be aware that they will be learning much more about CHD and its possible causes in a later unit of Biomedical Science.

2. What Causes CHD? This section of the reading states that there are statistical associations between CHD and several factors, any or all of which might cause, or help to cause, CHD. It is important for students to understand that these factors have been associated with CHD in groups of subjects, but that their presence or absence in an individual does not enable us to predict that the individual will or will not get CHD.

B. Discussion of the Homework Problems: You can discuss the remainder of the homework assignment in any of several ways. Some of the possibilities are listed below. The Background Information section following these Suggested Teaching Procedures shows the answers to problems 1-7 and also discusses problems 8 and 9.

1. You might conduct a class discussion of the third section of the reading, "A Study of Behavior and CHD," including the layout of the table of data, and move from there into a discussion of the homework problems, taking them one by one and working through to the end.

2. You might discuss the first seven homework problems first, as a means of explicating the table, then go back and discuss the last section of the reading; finally, you might discuss the last two homework problems, which call for more speculation and less reliance on numerical information.

3. You might divide the class into seven groups, each consisting of all students who have answered a particular one of the first seven problems, and ask each group to come up with a statement of the possible relationship (if any) between the information in one part of the table and the causes of CHD. Reserve time at the end of the class period for brief class discussion of groups' conclusions and for discussion of the last two homework problems.

C. An Important Warning to Students: Before this class period is over, it is vital that you discuss with your students their inability to apply statistical methods in analyzing these data. Inform the students that some of the differences they have observed in the table are not statistically significant, which means either that, from the point of view of statistics, these differences could easily have occurred by chance or that there were so few subjects that a statistician would not even hazard a guess as to whether the differences could have occurred by chance. In a later unit of Biomedical Mathematics students will learn how to use some statistical methods that they could use on this table of data to weed out the statistically insignificant differences.

ASSIGNMENT:

The assignment is described in "CHD as a Social Disease," in the Student Text. There are two parts to the assignment. The student is asked (1) to write a brief summary of the advantages and disadvantages of data manipulation as a method of inquiry (in so far as the students have used this method) and (2) to examine CHD as a "social disease" on a particular level of analysis and from a particular point of view (i.e., economics, politics, etc.), assuming (for the sake of inquiry) that Type A behavior is a contributing cause of CHD.

BACKGROUND INFORMATION:

The answers to problems 1-7 are displayed below in the tabular format suggested in the Student Text. "More" means that a higher percentage of men with CHD than men without CHD show the characteristic listed on the left; "fewer" means that a lower percentage of men with CHD show the characteristic.

Students may not know what to do about characteristics for which the men in the younger age group show one difference and the men in the older age group show the opposite difference. Without applying statistical methods it is impossible to say anything about these differences (or any of the others, for that matter), but as a general rule it might be a good idea to pay more attention to the differences shown in the right-hand column (all subjects), simply because the differences there are based on more subjects than are the differences in the other two columns, and therefore have a better chance of being statistically significant.

	39-49	50-59	all
Types of occupation			
Sales and publicity	more	more	more
Personnel hiring, training	more	fewer	fewer
Supervisory	fewer	fewer	fewer
Data handling	fewer	fewer	fewer
Scientific	more	more	more
Technicians	more	fewer	more
Engineers	fewer	more	more
Production (laborers)	more	fewer	fewer
Maintenance (laborers)	fewer	more	more
Level of occupational responsibility			
Top level	more	more	more
Second level	fewer	more	fewer
None	fewer	fewer	fewer
Annual income			
Under $10,000	fewer	fewer	fewer
$10,000-$25,000	more	more	more
Over $25,000	more	fewer	more
Marital status			
Single	fewer	fewer	fewer
Married	more	more	more
Divorced-single	fewer	more	more
Divorced-remarried	more	fewer	more

	39-49	50-59	all
Positive parental history of CHD	more	more	more
Smoking habits Never smoked	fewer	fewer	fewer
Formerly smoked	more	more	more
Current cigaret smokers	more	more	more
Av. no. cigarets smoked per day*	more	fewer	fewer
Positive history of high blood pressure	more	more	more

Problems 1-7 call for verbal descriptions of the differences observed; these are easily derived from the table above. These problem also call for ideas about what the observed differences might have to do with causing CHD. It is important that, during discussion of this part of these questions, students remember (1) that they cannot draw any conclusions, because they do not know whether the differences are statistically significant, and (2) that any observed difference between men without CHD and men with CHD might indicate a contributing cause of CHD--no matter how far-fetched the "cause" might sound.

Some of the more interesting problems for discussion on this level are the following.

Problem 2 (level of occupational responsibility): Could a high level of responsibility contribute to CHD? Could a low level help protect one against it?

Problem 3 (annual income): What things about men with middl and higher incomes might make them more vulnerable to CHD?

Problem 4 (marital status): Could being married (or divorce contribute to CHD? Could staying single protect one against it?

Problem 8 asks students to speculate about the fact that far mor men than women in this country get CHD. Students should be encourage to think about all the differences between men's and women's lives in this society which might be related to CHD. Do men eat more saturate fats, cholesterol and refined sugar? Are more men obese? Do more me smoke cigarets? Do men get less exercise than women? Are more men in situations where they have to meet deadlines, and might therefore be more likely to have a chronic sense of urgency about getting thing done? Are more men in situations where they have to compete, and might therefore be more likely to go into "competitive overdrive?" The chief objective of this part of your discussion should be to encourage students to think about characteristics of social situations which might contribute to a physical disease.

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*"More" means the average man with CHD smoked more cigarets per day than the average man without CHD. "Fewer" means the average man with CHD smoked fewer.

Problem 9 asks students to speculate about the fact that CHD affects a higher percentage of people in this country than in almost any other. Students should be encouraged to think about differences between the life style of people in this country and in other countries they know about. (In Unit II of Biomedical Social Science students will have opportunities to learn about and to compare the lives of people in several other countries.) Among the possibilities students might consider are that Americans eat richer food (i.e., more fat and cholesterol), smoke more, get less exercise and feel more pressure to hurry and compete with others.

LESSON 20: GROUP WORK ON CHD AS A SOCIAL DISEASE

SYNOPSIS:

After a discussion of data manipulation as a method of inquiry, students meet in groups to work toward programs for preventing or detecting "CHD as a social disease" on various levels of analysis.

OBJECTIVES:

The student will choose a level of analysis on which to approach a particular health problem and will state reasons for choosing that level of analysis.

The student, as a member of a group, will consider seven points of view in defining a health problem on the chosen level of analysis.

The student, as a member of a group, will consider seven points of view in seeking solutions to a health problem on the chosen level of analysis.

SUGGESTED TEACHING PROCEDURES:

A. Discussion of Data Manipulation as a Method of Inquiry:

1. Data Manipulation in General: Students have previously used data manipulation as part of another method of inquiry, the questionnaire survey. You might begin this discussion by asking students for their reactions to data manipulation in general--whether it is used on data one has gathered oneself or on data that others have gathered.

Data manipulation is useful primarily because it enables one to make generalizations from particular, or individual, information; one can begin with individuals' responses to a questionnaire or with the results of individuals' medical examinations, for example, and proceed to form generalizations about the respondents or examinees as a group. Moreover, if one is confident that this group is a representative sample of a larger population, one can make generalizations about this larger population.

Data manipulation is *limited* primarily because it works only with numbers; information that is not ordinarily expressed in numbers must be artificially quantified (as by assigning the value +3 to "strongly agree," +1 to "agree," 0 to "no opinion" and so on) or it cannot be used for data manipulation. A further limitation of data manipulation, from your students' viewpoint at the present time, is that in order to do it well one must have a command of statistical methods that the students have not yet encountered.

2. *Using One's Own or Others' Data*: The homework assignmen asked students to compare data manipulation using other people's data on the one hand, with both manipulation of one's own data and use of other people's non-numerical information on the other hand.

The chief *advantage* of manipulating other people's data, as opposed to manipulating one's own, is of course that one does not hav to go out and gather the data. But there are attendant *disadvantages* In using the data on coronary heart disease, for example, students cannot determine from the given information whether the people studie were a representative sample of larger population, and therefore they cannot generalize beyond the people studied; had they gathered the data themselves, they would at least have some basis for judging whether the people studied were a representative sample of a larger population. Another disadvantage of the given data is that they are not data on individuals, but data on groups (those under 50 without CHD, for example). Data on groups cannot be used to make statements about individuals within the groups. For example, the students have no way of determining whether the men 50 and over who had CHD and worked in positions of high responsibility were the *same* men 50 and over who had CHD and had high blood pressure. When individual data are missing, as in this instance, the generalizations one can draw are limited.

A further disadvantage of using other people's data is that one has no means of checking the data for errors in recording and processing. When using data one has gathered oneself, one can always go back to the original documents (questionnaires, medical records, etc.) and make a recount. When using other people's data, one has no access to the original documents; one must assume that the data gatherers, processors, printers and so on have found all their errors and corrected them--and that assumption may be wrong.

3. *Using Numerical Data or Other Kinds of Information*: One *advantage* of using numerical data supplied by others, as opposed to using verbal or pictorial information supplied by others, is that numbers can be used to make more precise statements about groups of people--a comparison of two percentages, for example, rather than a "slightly more than" or an "overwhelming majority." A more important advantage of using numbers is that the numbers can usually be rearranged and compared in different combinations whereas verbal generalizations (e.g., "The majority of subjects who had CHD were smokers, and the majority of those who did not have CHD either were smokers or had been smokers in the past") cannot be rearranged to show different facts.

One possible disadvantage of using numerical as opposed to verbal or pictorial information is that numerical information communicates very little of the emotional state of the persons who have been observed. For example, the given data show that more of the men who had CHD than of those who didn't have it were married, that more of them were in the $10,000-$25,000 salary range, that more of them were smokers and that fewer of them engaged in moderate physical activity at work; but the numbers do not show how these people felt about their marriages, their salaries and so on. And if there were data on such questions, they would necessarily represent feelings as numbers on a scale (e.g., from +3 for a "very happy marriage" to -3 for a "failing marriage"), which still would reveal nothing of the quality of the happiness or unhappiness.

B. Group Work on "CHD as a Social Disease": The remainder of the period should be spent in group work in which students combine their responses to the second part of the homework assignment. To form groups, get a show of hands to indicate how many students worked on each level of analysis. Each group you form should be working on one level of analysis. You can use groups of any size you want; since students have heretofore been working in relatively large groups, you might want to try groups of two to four students. Each student should be allowed to work on the level of analysis he has chosen, if possible.

Each group's assignment should be to work toward a program for action, on the level of analysis the group is working on, designed to attack the problem of "CHD as a social disease" as described in the assignment. The group should begin by defining the problem on its chosen level of analysis. The group should consider all seven points of view in defining and attempting to solve the problem, though students will have found already that not all points of view are equally useful on all levels of analysis.

During the first part of the next class meeting, each group will report to the class on the results of its work. During this class meeting, therefore, each group should spend the last 5-10 minutes of its time preparing a written report.

ASSIGNMENT:

There is no assignment.

LESSON 21: GROUP REPORTS ON CHD AS A SOCIAL DISEASE

SYNOPSIS:

In this lesson groups report on their work on CHD, and students discuss their conclusions from the groups' work and their responses to the methods they have used in studying CHD. As a homework assignment, students read about a study in which researchers used the method of field manipulation and observation.

OBJECTIVES:

The student will describe CHD as a health problem on at least two levels of analysis.

The student will describe at least one thing that might be done to prevent CHD on each of at least two levels of analysis.

The student will describe at least one advantage and at least one disadvantage of (1) studying a health problem on a single level of analysis, (2) studying a health problem from several points of view and combining the results, and (3) attempting to combine the work of several people all of whom have studied a health problem on the same level of analysis and from the same points of view.

STUDENT TEXT:

Reading: Field Manipulation and Observation

SUGGESTED TEACHING PROCEDURES:

A. Group Reports: Most of this class period should be spent on group reports and class discussion of particular reports. Set time limits so that all groups will have equal amounts of time, and so that there will be time left at the end of the period in which to discuss CHD and the groups' work in general.

Each group should plan its time so that, after its report, the class will be able to ask questions, offer suggestions or make criticisms. The main objective of reporting time, however, should be to illustrate the diversity of ideas that students were able to come up with. No group should be expected to have thought of everything or to have produced a polished plan, but the class as a whole should be expected to have thought of a variety of considerations related to the prevention of CHD.

B. General Discussion: There are two topics of discussion, each of which should receive some attention. One is the subject matter, preventing CHD. The other is the methods students were asked to use in studying the subject.

1. Preventing CHD: Ask for generalizations about the subject of preventing CHD. What are the important problems? What steps could be taken immediately? What procedures would take a long time? Most generalizations will probably be confined to particular levels of analysis, but the class might also be encouraged to draw conclusions about CHD in general. Students should note explicitly the assumptions about causes of CHD on which their conclusions are based.

2. The Methods Used: Ask for students' comments on the methods they were asked to use in seeking ways to prevent CHD. The class should discuss advantages and shortcomings of (1) studying a health problem like CHD prevention on one level of analysis at a time, as opposed to either trying to study it on all levels or trying to study it without thinking about which level of analysis one is operating on; (2) examining a health problem from one point of view at a time and then trying to combine all points of view into a unified treatment of the problem, as opposed to either working on just one point of view or not thinking about the point of view one is using; (3) combining the ideas of two or more people all of whom have been thinking about the same health problem from the same several points of view, as opposed to either working on the problem alone or combining the work of people who have been using different points of view (as in the class' work on the future of medical technology); (4) studying the psychological and social aspects of a health problem without considering the physical aspects of the problem, as opposed to either studying the physical aspects alone or combining the social-science points of view and the natural-science points of view (which the students have not yet studied in relation to CHD); and (5) working on a complex health problem like CHD prevention when one has relatively little information about the problem.

ASSIGNMENT:

Assign the reading, "Field Manipulation and Observation," in the Student Text.

LESSONS 22 and 23: ASSUMPTIONS AND VERBAL REPORTS IN SOCIAL SCIENCE INQUIRY

SYNOPSIS:

After discussing field manipulation and observation, students discuss ways in which an inquirer's assumptions and his reliance on verbal reports can influence his observations. As a writing assignment, students describe how these influences might have operated in inquiries they have conducted for this course. In the second lesson of this sequence, students discuss what they have written. As a homework assignment, students describe ways of avoiding these influences in researching a given health problem.

OBJECTIVES:

The student will state whether he thinks it is ethical to lie in the pursuit of knowledge and will state reasons for his answer.

The student will describe at least one practical advantage and at least one practical disadvantage of field manipulation and observation in relation to other methods of inquiry the class has studied.

Given a description of a research project using a method of inquiry the class has studied, the student will describe (1) an assumption on the inquirer's part which would have led him to a false conclusion and (2) an item of verbal information the inquirer might have received which, if he believed it, would have led him to a false conclusion.

Given a description of a health problem, the student will describe ways of minimizing the extent to which assumptions and reliance on verbal information lead an inquirer to false conclusions.

SUGGESTED TEACHING PROCEDURES:

A. Discussion of Field Manipulation and Observation: After reviewing the two experiments described in the reading to be sure that all students understand what was done and what the results were, ask for comments on this method of inquiry. There are several areas that should be touched on.

1. Ehtical Problems: This method of inquiry often relies on deceiving the people whose behavior is being observed. In American culture, lying is generally held to be unethical. Is it ethical to lie to people (e.g., to say that one has had unusual psychic experiences when one has not, or to say that one is going to send a pseudopatient to a hospital but not send one) in the pursuit of knowledge? Is it ethical in the pursuit of any kind of knowledge? Only knowledge that one thinks will be used later for the benefit of others? No knowledge at all?

2. Advantages: In what kinds of situations is this method of inquiry particularly useful? Consider the kind of knowledge this researcher was after. Is there any other way he could have got it? Suppose he had simply asked hospital staff members whether they could distinguish a sane person from an insane one. Would he have got the same answer? Would he have been equally justified in believing that the answer he got was correct?

3. Disadvantages: This method of inquiry requires, in addition to deception, more or less elaborate preparations. In what sorts of situations would it be just as good or better to use a simpler method of inquiry? Of the methods the class has used, which would be the best for finding out how mental hospital staff members behave toward patients? Which would be best for finding out how mental patients feel about the way they are treated? Which would be

best for learning what criteria staff members use for deciding to admit a patient? Which would be best for learning what criteria staff members use for deciding to release a patient? (Students' reactions to these questions are unpredictable. However, you might point out that these situations present, in varying degrees, the possibility that verbal reports will be unreliable. To the degree that one can expect verbal reports to be reliable, one does not need to use field manipulation and observation; one can use simple observation, a questionnaire survey or the unstructured interview.)

B. Discussion of Reports, Assumptions and Perceptions:

1. Assumptions: Briefly review the argument given in Section D.1. of the homework reading, that an inquirer's assumptions about the situation he is studying can influence his perceptions of the situation. To illustrate the importance of this influence, you might describe a few hypothetical situations and ask students to describe, in each case, how assumptions might have influenced perceptions and how the influence of assumptions on perceptions might have been avoided.

a. A person is doing book research on the health care delivery system in the People's Republic of China. He has two kinds of books to work with: books published in the People's Republic of China, and books published by foreigners (including Americans) who have visited China. He begins with the assumption that any book published in the People's Republic of China is unreliable because it was written by Communists. In the course of his research he finds that all books published by foreign visitors to China agree, to one extent or another, with the statements made in the books published in China. He reasons that all the foreign visitors have been decieved or are Communists themselves, and ends with the conclusion that it is impossible to learn anything about health care delivery in the People's Republic of China.

b. A person is conducting unstructured interviews with patients in a rural clinic for American Indians. He is trying to find out what complaints the patients might have about the clinic. He has been told that some American Indian patients stay away from clinics like this one because they do not like the impersonal manner of the health workers, they do not want to be separated from their families in case of hospitalization or they do not like the needles, thermometers and other equipment used in the clinics. The inquirer assumes that if a patient has a complaint about the clinic and is asked to describe it, he will describe it. The inquirer interviews twenty patients and former patients of the clinic, but hears no complaints. Then, concluding that these people have no complaints, he interviews twenty people who, according to the clinic staff, have avoided the clinic even though they were sick. But again he hears no complaints. He concludes that what he has heard is not true, that people stay away from clinics not because they have any complaints about the clinics, but for some other reason.

c. A person is conducting a questionnaire survey on a community's attitudes toward health professionals. The objective of the research is to find out what health professionals might do to improve their image in the community. The inquirer assumes that people in the community do not have any strong negative feelings about health professionals, and that any problems which have arisen between the professionals and ordinary citizens are due to a lack of communication between the two sides. He therefore does not provide any opportunities in his questionnaire for citizens to express negative feelings about health professionals. He does provide many opportunities for citizens to show how much they know about health care, the average income of health workers the range of health problems that arise in the community and other informational items. The results of the survey show that, on the average, the citizens are indeed quite ignorant of what health workers do for a living. The researcher recommends that relations between the health workers and the community can best be improved by a program of health education (for children) and public service announcements (for adults) about how hard health professionals work and how many problems they face.

2. Verbal Reports: Briefly review the argument given in Section D.2. of the homework reading, that any inquiry which relies on verbal reports for information is on thin ice. Review the hypothetical situations you have just discussed and ask students how great the reliance on verbal reports is, what other sources of information might be used, and how the reliability of the verbal reports might be investigated.

C. Writing Assignment: This writing might be done as a homework assignment between the two lessons of this sequence. Writing might also occupy the latter part of the first lesson or the earlier part of the second lesson or both.

The length and format of the writing assignment are up to you. Each student should write on one or more of the inquiry methods the class has used (listed below), considering the following questions: (1) What assumptions might you have had which would influence your findings or conclusions in this exercise? (2) How might you have prevented these assumptions from influencing your findings or conclusions? (3) To what extent did you rely on verbal information (spoken or written) in this exercise? (4) In what ways might this verbal information have been unreliable? (5) To what extent did you use (or could you have used) observable behavior (posture, gesture, tone of voice, etc.) to verify the information you got from verbal reports? (6) What other sources of information did you use (or could you have used) to verify the information you got from verbal reports and (if applicable) from observable behavior?

The exercises students might write about are the following.

1. Students used participant observation to obtain descriptions of the health-related behavior of Americans.

2. Students used a questionnaire survey to find out what people thought "health" was.

3. Students used role-playing to obtain information about the advantages and disadvantages of several specialists' meeting together to discuss a single problem (the future of medical technology in America).

4. Students used book research to obtain information about health careers.

5. Students used the unstructured interview to learn whether people think emotional stress can cause physical symptoms.

6. Students used data manipulation to discover possible relationships between certain personality characteristics and social situations, on the one hand, and coronary heart disease, on the other hand.

D. Discussion of the Writing Assignment: The objectives of this discussion should be to get students (1) to think about the limitations of the methods of inquiry they have been introduced to, and (2) to think about ways in which an inquirer can minimize the effects of these limitations on his research. Conduct the discussion in whatever way you find congenial--e.g., by asking the class about one method of inquiry at a time, by asking about one of the questions at a time (e.g., "How might assumptions have influenced your findings in using these methods of inquiry?") or by asking individual students to read aloud what they have written and then asking other students to comment on what they have heard.

The following will indicate the range of ideas that might be discussed.

1. Participant Observation: Students' assumptions about other people's motivations might have affected their findings, since they were trying to observe behaviors related to health. A student might have written that another person washed his hands to avoid getting germs in his mouth when the real reason was that the person thought his dirty hands looked unattractive. It is difficult to do anything with assumptions about motives, except try not to make such assumptions. The inquirer might ask the other person why he washed his hands, but then he would not be doing simple participant observation. He might have avoided error by recording all behaviors that he thought could have been related to health, reporting them all as such, and explicitly announcing what sorts of behaviors he assumed could have been health related (e.g., those related to cleanliness, nutrition, exercise and fresh air). In this method the inquirer relies on both the spoken word and observable behavior; how much of which depends on how much the persons being observed talk and how much they "behave" in other ways. Observable behavior could be used as a check on verbal reports to the extent that the two sources of information agree with or contradict each other. If a person's actions belie his words, one might conclude that his words, at least on that subject, are unreliable--though in doing so one assumes that one has correctly interpreted his actions.

2. Questionnaire Survey: Assumptions influence the use of a questionnaire from the outset. The inquirer makes many assumptions in the course of writing a questionnaire. He assumes that the respondents will understand the questions as he understands them, that the questions he has prepared will elicit everything interesting or useful that the respondents have to say and that the answers he provides (if any) cover the full range of answers respondents would give. The inquirer also assumes that the respondents will answer the questionnaire truthfully. (On some questionnaires which contain questions that the inquirer thinks respondents might lie about, there may be other questions about related topics, designed to "check up" on the respondents. If a respondent answers the explicit question one way and the other questions the other way, the inquirer considers the respondent's answers unreliable.) The other assumptions cannot be avoided; they are inherent in questionnaire surveys, and one can only attempt to be sure that one knows the respondents well enough to make those assumptions valid. Questionnaire surveys rely entirely on verbal reports. These might be unreliable because the respondent is lying, is misinformed, fails to understand the question or does not find the right answer among those offered by the inquirer. Observable behavior is usually not a useful check on the verbal reports obtained in questionnaire surveys. If one is restricted to using questionnaire surveys, the only source of information one can turn to for verification is more surveys: more respondents, more questions, more answers, different respondents, different questions, different answers and so on.

3. Role-Playing: One's assumptions about the motives of the person whose role one is playing might influence what one learns from role-playing. For example, a person might believe all specialists and experts are pig-headed and won't listen to reason. When role-playing a specialist or expert, this person is likely to play the role of a pig-headed expert. If he plays pig-headed from the outset, he might never learn anything about how real experts feel or what makes some of them so pig-headed. One might avoid this error by beginning with the assumption that experts (or whoever one is role-playing) are just like oneself, with all the same virtues and no greater number of defects. Then, as one perceives the situation which the role puts one in, one can observe how the situation influences one's behavior. Role-players in a group situation rely largely on verbal reports but may also learn something about others' feelings from their gestures, postures and so on. All these sources of information are highly unreliable because one never knows whether one is seeing or hearing the role or the actor. A student doesn't know, for example, whether he is facing another student who happens to be hostile toward him personally, or an "expert" who is hostile toward him as another "expert." A useful source of information to supplement role-playing is a discussion among role-players after the role-playing is over. In such a discussion the real individuals can talk about what they experienced and what they observed.

4. Book Research: In book research one relies totally on verbal reports. The assumption that the reports one is getting are all true, or all false, may influence one's conclusions from book research. The information in a given book may, of course, be completely unreliable. There are a variety of ways of checking up on the reliability of the information in books. Sometimes it helps to look at the publication date; an old book might contain information that once was true but now is false, or that once was thought to be true but now is known to be false. Often it is helpful to consider the authorship of the book: have I seen information from this same source which I know, independently, to be either true or untrue? Can I ask anyone whom I trust about their judgement of this source's reliability? What is the likelihood that this person is serving his own interests by saying what he says rather than something else?

5. Unstructured Interview: In the unstructured interview one assumes the informant is telling the truth, but one has the option of asking further questions to test the truth of earlier answers. One also assumes the informant knows what he is talking about, but one can usually check up on that by asking other informants who one thinks are equally knowledgeable about the subject matter. One relies heavily on verbal reports, but can also observe behavioral cues--posture, gesture, tone of voice, etc.--as a source of information about how the informant feels about the questions or his answers. The main source of verifying information is other informants.

6. Data Manipulation: Manipulation of data gathered by other people is a subcategory of book research, subject to all the same limitations and all the same checks. But it has further limitations in that it involves the use of numbers. Numbers sometimes show significant differences and sometimes do not. If the differences are significant they may be so only in relation to a very narrowly restricted group of people. And if they were once significant in relation to those people they might no longer be so by the time one gets hold of the numbers and starts comparing them and trying to draw conclusions from them. The questions whether the differences one observes are significant and, if so, in relation to whom, cannot be judged satisfactorily without the use of statistical methods that the students have not yet encountered. Whether differences that were significant once are significant still is largely a question of judgement: Are the numbers about something that changes? The only way to be sure is to go out and gather new numbers about the same subject--or find new numbers that somebody else has gathered.

The class should also discuss field manipulation and observation in relation to these questions. In using this method one can avoid relying on verbal reports, as in the first experiment described in the homework reading, where the inquirers looked for two unmistakable behaviors: admitting a patient, and letting him out. One is left, however, with assumptions about motives--the same problem that arises in simple participant observation. (Note that, while the pseudopatients were in the hospitals, they were participant observers. The "manipulation" was the lying they did to get in in the first place; what was "observed" was whether they could get in and, if so, how long it took them to get out again.)

ASSIGNMENT:

Describe a health problem to the class and ask each student to describe a way of studying the problem, using one of the methods of inquiry the class has discussed, while minimizing errors due to inquirers' assumptions and errors due to unreliable verbal reports. The assignment should not be a brain-buster; it should be more in the nature of a review exercise. The written work required should not be long. The following is a suggested health problem for use in this assignment.

Some people say that pesticides are necessary. These chemicals are used to control insects that eat our food while it is growing or when it is in storage, to control other insect pests that eat other things or merely bother people, and to control pests that carry diseases such as malaria, typhus, sleeping sickness and yellow fever. These people say that without pesticides there would be very little to eat and there would be serious outbreaks of disease. Other people say that pesticides are unnecessary. The best way to control insects is the way they are controlled in the wild, by other insects: predators and parasites that eat the insects we call pests. When we use insecticides we often kill not only the pests, but also the predators and parasites that eat the pests. Afterward, it often happens that the pests are able to make a comeback but the predators and parasites aren't; furthermore, it often happens that, in the newly disrupted environment, new pests appear which may be even harder to get rid of than the old ones. These people also say that pesticides hurt the workers who apply them, family members and other people who come into contact with these workers, and even citizens who happen to be driving past when insecticides are sprayed or happen to drink water or eat food contaminated with pesticide residues.

LESSON 24: EFFECTS ON SUBJECTS OF OBSERVING THEIR BEHAVIOR

SYNOPSIS:

While students discuss the homework assignment they are filmed by a visitor to the class (nonparticipant observer). During the remainde of the class period they discuss the effects on their behavior of thei knowing they were being watched.

OBJECTIVES:

The student will describe whether and how awareness of being watched might influence people's behavior in each method of inquiry the class has studied.

ADVANCE PREPARATIONS:

Arrange for a person who is not ordinarily in your classroom to come in during this lesson with a movie or television camera and, if possible, a bright light. The visitor will pretend to be filming the class during the first part of the discussion. Among the details you should arrange in advance are the following.

1. Be sure the equipment will be available.

2. Arrange a "cover" for the visitor and be sure that both you and the visitor know what the cover is. If the visitor is someone from the school whom students are likely to have seen there, then the cover should be related to school activities--for example, the visitor is preparing for presentation to the Board of Education on the progress of the Biomedical courses. If the visitor is a stranger, the cover can be more exotic--for example, the visitor is compiling a film record of classroom behavior in four societies, for psychosocial analysis.

3. Instruct the visitor to station himself toward the front of the room (or in a position where most students will be able to see him most of the time) but off to one side (or in a position where the light will not blind students when he turns it on). Instruct him to use the camera (and the light) approximately 20% of the time, and especially when students are speaking. You might arrange a time for the sham filming to stop; you should retain at least the second half of the class period for discussion of the sham filming and its implications.

4. If the visitor can remain in the classroom until the end of the period, ask him to observe the students' behavior when he points the camera at them, so that he can take part in the discussion of students' behavior during the second part of the period.

5. If the personnel and equipment are available to you, there is no reason not to use real videotape equipment and show the results to the class during the second part of the class period.

SUGGESTED TEACHING PROCEDURES:

A. Discussion of the Homework Assignment: Introduce the visitor and give his cover story. Point out that he is using nonparticipant observation, a new method of inquiry. Proceed in as normal a fashion as possible with a class discussion of the homework writing assignment. Ask for students' ideas in response to the assignment. If you need questions to keep the discussion going in the presence of the camera, you can ask about the various methods of inquiry the class has used: How could participant observation be used to find out more about the effects of pesticides? How could a questionnaire survey be used for this purpose? Role-playing? Book research? Unstructured interviews? Data manipulation? Field manipulation and observation? Nonparticipant observation?

In the course of the discussion students should be encouraged to talk about (1) how assumptions might distort an inquirer's findings or conclusions with each of these methods of inquiry, (2) how verbal reports might distort findings or conclusions and (3) how both kinds of distortion might be prevented or allowed for. The subject matter suggested for the assignment is ripe for both kinds of distortion because (1) the issue is one of ecological preservation _versus_ immediate human need--always an area in which people have vague conviction (assumptions) in place of information--and (2) what real, trustworthy information there is about either chemical poisons or the ways of bugs is highly technical information, which means that few people are able to understand it and even fewer are able to tell whether it is trustworthy or not.

B. _Discussion of the Sham Filming_: At the conclusion of the first part of the discussion (if not before), the visitor can stop filming. Reveal his identity and his function in the classroom, namely, to show the students what it is like to be the object of nonparticipant observation.

Ask the students to assume that the visitor really had been trying to gather trustworthy information about the way people in this particular class behave. Would the information he recorded have given an accurate, undistorted view of normal classroom behavior in this class? If not, why not?

The answer is, of course, that people do not usually act natural when they know their behavior is being recorded. If the visitor had been engaged in real nonparticipant observation of this class, his observations and any conclusions he might have drawn from them would have been distorted, to one degree or another, by the fact that the students knew they were being observed.

(During this part of the discussion you might profitably use either the visitor's verbal report of how the students behaved when they thought they were being filmed, or a showing of a part of the videotape, if there is one.)

C. _Discussion of Other Methods of Inquiry_: Ask students to consider, one at a time, each of the other methods of inquiry they have used (or, in the case of field manipulation and observation, have read about). Might the findings or conclusions have been distorted by people's awareness that their behavior was being recorded?

1. _Participant Observation_: If people knew they were being watched, then their behavior and thus the inquirer's observations migh have been distorted. If people did not know they were being watched, their behavior wasn't distorted, but they were being spied on (watched without their knowledge).

2. _Questionnaire Survey_: People knew they were being "watched," i.e., that someone was going to read their answers. They may have distorted their answers. In this case the problem of people' knowing they are being watched is the same as the problem of people's giving false verbal reports. (In connection with questionnaire surveys, it has been suggested that political polls, by asking people's

opinions on political issues and candidates, might actually change the political situation by causing people to think about these things who ordinarily would not think about them. The method of inquiry might not only get a distorted picture of reality, it might change the reality, itself.)

3. Role-Playing: Everyone knows he is being watched in a role-playing situation. Since what one is asked to do is "act unnatural"--i.e., play the role of another person--the questions of distortion of observations by the awareness of being observed is irrelevant.

4. Book Research: No one is being watched, though the author whose book one is reading may have been influenced by the "watching" of editors, publishers and other writers.

5. Unstructured Interview: As in survey research, here the informant knows he is being "watched" (listened to) and might distort his verbal responses.

6. Data Manipulation: No one is being watched, except in the way noted under "Book Research," above.

7. Field Manipulation and Observation: The two experiments described in the student reading on this method show two possibilities. In the first experiment, the hospital staff members did not know they were being watched. In the second experiment, they did know they were being watched, and that knowledge was what caused them to identify several real patients as possible pseudopatients.

C. Unobtrusive Observation as an Alternative: Point out that in using participant observation students may have watched people who did not know they were being watched. As long as people do not know they are being watched, the watching will not influence their behavior. There is, however, an ethical problem: Is it moral to observe and record the behavior of people who know there are others present, but do not know that one of those others is watching them? (This may have happened during the participant observation activity.) Is it moral to observe and record the behavior of people who do not even know there is anyone else present? In short, is it moral to spy on people? Is participant observation an invasion of privacy? Is it a form of deception? Discussion of these problems will continue in the next lesson.

ASSIGNMENT:

There is no assignment.

LESSON 25: UNOBTRUSIVE OBSERVATION

SYNOPSIS:

During most of this lesson students discuss ethical and practical difficulties in the use of unobtrusive observation as a method of inquiry in health-related situations. At the end of the period, student complete the first half of a "test" that will be completed in the next lesson.

OBJECTIVES:

The student will state whether he thinks it is ethical to observe people without their knowing they are being observed and will give reasons for his answer.

Given a description of a health-related situation in which unobtrusive observation can be used, the student will describe at least one method of unobtrusive observation that would be useful in that situation.

The student will describe a way of using unobtrusive observation in that situation which he believes would be ethical, or will state why he believes it is not ethically possible to use unobtrusive observation in that situation.

SUPPLIES:

Test of Ability to Interpret Biomedical Terminology (Section A) (one per student)

SUGGESTED TEACHING PROCEDURES:

Note: Be sure to reserve time at the end of the class period for administering Section A of the Test of Ability to Interpret Biomedical Terminology (Part D below).

A. Situations in Which Unobtrusive Observation Might Be Used: Describe to the class one or more situations in which it might be thought desirable to observe people's "natural" behavior in order to improve health care. Three such situations are outlined below; there may, of course, be many others.

1. First Situation: A health worker suspects that a child in his care is being subjected to undue emotional stresses by his parents. The health worker wants to see how the parents treat the child when there is nobody else around.

2. Second Situation: A supervisor in a clinic suspects that certain workers under his supervision are not working properly when they are unobserved--e.g., they are ignoring patients whom they are supposed to be helping. The supervisor wants to know how these worker behave when the supervisor is not watching.

3. Third Situation: A health researcher suspects that young school children sometimes subject their weaker peers to cruel treatment, which places the weaker children under emotional stress and may also be psysically harmful to them. The researcher wants to observe how school children interact when no adults are present.

B. Questions for Writing or Discussion: You might ask the class to respond briefly in writing to the situation you have described (or, if you have described more than one, to respond to one of them). Students should consider both the ethical and the practical side of the situation. Among the questions you might ask explicitly are the following.

1. In the situation you are reacting to, is it morally right for the health worker to observe the other persons without the others' knowledge? Why, or why not?

2. The health worker has trouble making up his mind whether to try to observe the others without their knowledge. What values might be in conflict as the health worker tries to make up his mind? (What are the arguments pro and con, and what are the reasons behind the arguments?)

3. If you think unobtrusive observation would be moral in this situation, what changes in the situation (if any) might make it immoral? If you think it would be immoral in the situation as described, what changes in the situation (if any) would make it moral?

4. Aside from the question whether it would be moral, would it be possible for the health worker in this situation to observe the others without the others' knowing they are being observed? How?

5. Among the methods that the health worker might use to observe the others without the others' knowledge, is one easier to use (simpler, cheaper, involving fewer or less elaborate preparations) than others? Which one? Why?

6. Among the methods that the health worker might use, is one more likely to be morally objectionable than others? Which one? Why?

C. Discussion: With or without a writing assignment, the situations and questions above can be used as the basis for a discussion of the ethical and practical difficulties of unobtrusive observation.

1. Ethical: The value underlying most objections to the use of unobtrusive observation is, of course, the right of privacy. The Constitution of the United States protects the privacy of citizens against "unreasonable searches and seizures." The laws of many states also protect the privacy of the relationship between a physician and his patient; these laws allow privileged communications between physician and patient, which the physician cannot be legally compelled to discuss with anyone else.

In the situations described in Part A on the preceding page, however, the question is whether the health worker (including the researcher) has the right to invade the privacy either of patients, of patients' family members, of research subjects or of other health workers. Some people argue that at least some of these invasions of privacy might be justified by a different value.

Several different values have been adduced. In terms of the situations described above, one such value is that a physician, another health worker or an agent of the state may have the right to interfere in the relationship between parents and their child, in the interest of protecting the child (first situation). Another is that a health worker in a supervisory position, who is responsible for the behavior of the workers under his supervision, has an obligation to protect patients or clients from unauthorized behavior, as well as from incompetence, on the part of those workers (second situation). Another is that a researcher may invade the privacy of subjects--but not divulge private information about them to others--in order to gain information that may later be beneficial to those subjects or to others (third situation).

There may, of course, be other values involved in these three situations, and if you or the students think up other situations in which unobtrusive observation might be used, you will be able to identify other values that might conflict with the value of privacy.

2. Practical: It is much easier to find a way to spy on people than it is to sort out all the reasons for doing it and for not doing it. Among the methods that have been used are closed-circuit television, radio transmission from hidden microphones, observation through half-silvered mirrors (which look like mirrors from the viewpoint of those being observed, but serve as windows for those on the other side), and observation by a person who is not known to be an observer (i.e., participant observation). Each of the situations described above allows the use of one or more of these methods.

Any of these methods may be considered morally objectionable if they are used without the knowledge or without the consent of the persons being observed. One of them, the use of a spy, cannot be used in any other way. The other methods can be and are used, in some situations, with the knowledge and consent of the persons being observed. For example, health researchers may ask a family to interact in a specially prepared room while researchers watch on closed-circuit television or through a half-silvered mirror. The persons being observed know they are being observed, but the observers are not present and therefore do not interfere in the interactions among the persons being observed. This method could be used in the first situation described above.

Children are sometimes observed through closed-circuit television or through half-silvered mirrors, without the children's knowledge but with the knowledge and consent of their parents. This procedure is not legally objectionable, since parents have legal authority to make decisions for their children. It may nonetheless be considered objectionable to use this procedure without the knowledge of the children. It is possible, of course, to inform the children of what is going on. This procedure could be used in the third situation described above.

In the second situation described above, should the supervisor spy on the workers and then use the evidence, if any, to force them to resign? (This might be considered blackmail.) Should he try to reassign the workers to jobs in which they could not do the things he suspects they have been doing, or in which they could be more closely supervised?

D. Preparation for Lesson 26: The reason for the following exercise is explained in Lesson 26. When about ten minutes remain in the class session, distribute the handout, "Test of Ability to Interpret Biomedical Terminology (Section A)," to each student. Tell the students this is a test of their ability, at this early point in the Biomedical curriculum, to recognize and interpret complex biomedical terms. Stress that the test is for analytical purposes, and the results will not be scored for grading. Further, each student will be told how well he or she did. Also explain that this is the first part of a two-part instrument, and that in the next class meeting the students will be asked to complete a similar test which also will not be scored for a grade. Students should be able to read the instructions and complete the short test in a very few minutes. When you have collected the tests, use the instructions in Lesson 26 for tallying the results.

ASSIGNMENT:

There is no assignment.

NAME ______________________________

TEST OF ABILITY TO INTERPRET BIOMEDICAL TERMINOLOGY (Section A)

As a student in the Biomedical Curriculum, you will be encountering many new terms. This simple test is intended to obtain a measure of your ability to understand such new terms even though they have never been discussed and you have probably never read them before. You will not be graded on your ability, but you will be told the results of the test. Below are ten new biomedical terms. When you are told to begin, write in the space to the right of each term your best estimate of the meaning of the term. If you do not know what a term means, guess. Don't take too much time; the first idea that comes to mind is often the most nearly correct. Be sure to write some answer, even though it is only a guess, for each of the ten terms. When you have done this, answer the questions at the bottom of the page.

1. immunocephaly ______________________________
2. fibrocathetitis ______________________________
3. thermoremia ______________________________
4. hypertonitis ______________________________
5. calcitration ______________________________
6. embolipid ______________________________
7. renalism ______________________________
8. syringoplasia ______________________________
9. hypergram ______________________________
10. ligamitis ______________________________

People differ in their ability to guess the meanings of these terms. This difference has nothing to do with intelligence, and scores vary quite a bit. Of the above ten terms, how many do you think you guessed correctly or at least guessed within the general idea of the term? __________

How do you judge your own ability to estimate the meaning of these biomedical terms? (Check only one answer)

Excellent ______ Good ______ Fair ______ Poor ______

LESSONS 26 and 27: LABORATORY EXPERIMENT WITH HUMAN SUBJECTS

SYNOPSIS:

In the first of these two lessons the students serve as subjects in a laboratory experiment, and tally the results of the experiment. In the second lesson of this sequence the students discuss this experiment and the method of laboratory experimentation in general. The homework assignment is a reading on air pollution.

The nature of the experiment is as follows. At the end of the preceding lesson, students completed the Test of Ability to Interpret Biomedical Terminology (Section A) and indicated how well they thought they had done on the test. At the beginning of Lesson 26 they will complete Section B. While they are working on Part B, about half of them (the experimental group) will be told by student confederates whom you have prepared in advance that they appear to be doing well; the other half (the control group) will not be told anything. When students have completed the test they will again indicate how well they think they have done. (Actually, all terms on the test are spurious.) Any difference between the experimental group's and the control group's estimates of how well they have done on Section B of the test may serve as a measure of the influence of positive feedback on self-perceptions.

OBJECTIVES:

The student will identify at least one essential element of any laboratory experiment and state why he thinks it is essential.

The student will explain the purpose of control groups in laboratory experiments.

The student will state whether he thinks it is ethical to use deception in laboratory experiments using human subjects and will give reasons.

The student will state whether he thinks it is ethical to use this method of inquiry to get information that can be used to control people's behavior and will give reasons.

The student will describe at least one situation in which knowledge gained from this experiment might be used in health care. (This assumes that the experiment shows an effect of positive feedback on students' self perceptions.)

SUPPLIES:

Test of Ability to Interpret Biomedical Terminology (Section B) (one per student)

STUDENT TEXT:

Reading: Air Pollution

ADVANCE PREPARATIONS:

There are three tasks that must be accomplished after you administer Section A of the "test" and before you begin Lesson 26. First, you should call aside two or three preselected students to assist you in the second part of the experiment. These should be very good students whom others believe to be especially competent, and who can carry out the necessary deception with a straight face and believable manner. You should speak to them immediately after administering Section A of the test, before they have had a chance to discuss the test with other students.* Inform them of the nature of the experiment. Stress the importance of secrecy and the essential nature of their role. When you have distributed Section B of the test, these two or three student assistants will circulate through the class and make positive comments about the answers being given by students in the experimental group. They will know who the members of the experimental group are because experimental subjects' "tests" will not have a letter "C" in the upper right-hand corner. The student assistants are not to make any comments to members of the control group (whose papers will have the letter "C" written on them), but if they are caught with a direct question they should say something as neutral as possible (e.g., "Keep working!"). For those students in the experimental group, they should say something positive, such as, "You're doing pretty well; it looks like you've got the knack for it." Also tell the assistants that when class begins you will single them out as being especially able, and will ask them not to take Section B since they got most terms right on Section A.

The second task to accomplish before beginning Lesson 26 is the labeling of control subjects' test sheets. Determine about how many students will be present in the class (after subtracting the number of students who are assisting you) and select that number of copies of the handout, "Test of Ability to Interpret Biomedical Terminology (Section B)." On every other copy, print the letter "C" in the upper right-hand corner so that the student assistants will be able to see it, but small enough so that it will not distract the students. It doesn't matter if you are slightly off in your estimate of the number of students; the point is to have about half the class in the control group, and to see that they are in that group by chance.

Finally, you should prepare a tally sheet in advance of the lesson. You can record this on the chalkboard and keep it from view, reproduce it as a transparency or reproduce it in multiple copies so that each student has a copy. A sample is included on the next page; you may wish to use some different form. For instructions on using the tally sheet see Part B of the Suggested Teaching Procedures, below.

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*You can inform them of the nature of the experiment before they complete Section A if it is not possible to do so immediately afterwards.

SAMPLE TALLY SHEET: BIOMEDICAL TERMS TEST

CONTROL GROUP

Person	Changes in Estimates (Section B - Section A)	
	Correct Words	Ability
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
N=	TOTAL	TOTAL
AVERAGE CHANGE		

EXPERIMENTAL GROUP

Person	Changes in Estimates (Section B - Section A)	
	Correct Words	Ability
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
N=	TOTAL	TOTAL
AVERAGE CHANGE		

Note: To calculate Average Change, divide Total by N for each column. Range of possible Change in Estimates is from +10 through -10 for Correct Words and from +3 through -3 for Ability.

SUGGESTED TEACHING PROCEDURES:

A. Administration of Section B of the Test: When class begins, announce that Section B of the Biomedical Terminology test will be given. Students are likely to make negative comments; it isn't easy to guess the meanings of unfamiliar words. Tell them that two (or three) members of the class certainly don't seem to have had a problem, since they got most terms correct on Section A; in fact, those students will not take Section B, since they can hardly be expected to do any better. They will, instead, be allowed to look at what others are doing and comment.

Distribute the test and answer any questions students have. As with Section A, encourage students to guess, and stress that the results will not be used in any grading you may do. When students have completed the tests, ask them to keep their test sheets so that they will be able to compare the results with those on Section A.

B. Recording the Results of Both Sections: Distribute to each student (except the assistants) his own copy of Section A. At this point students should be informed that they will be asked to compare their own estimates on how well they have done on the two sections of the test. When you reveal the Tally Sheet, which is on the chalkboard or on a transparency, students may notice the presence of a "control group" listing and an "experimental group" listing. Even if they do not, you will need to tell them that those with a "C" on their second test sheet are in the control group, and that the meaning of this will be explained after the tallying is completed.

Before you begin to tally the results, ask each student to convert his estimates of how well he did on the two sections of the test into numbers, according to the following scale:

Excellent = 4

Good = 3

Fair = 2

Poor = 1

Tell the class that when you ask for a student's results you want him to report, first, the number of words he thought he guessed correctly on Section A, and second, the number he thought he guessed correctly on Section B; third, the numerical score (1, 2, 3 or 4) he gave himself on Section A, and fourth, the numerical score he gave himself on the Section B. Tell the class that what you will record on the tally sheet is (1) the difference between the number of words the student thought he guessed correctly on Section A and the number he thought he guessed correctly on Section B, and (2) the difference between the numerical score he gave himself on Section A and the score he gave himself on Section B.

Tally the results from all students in the control group (those with "C" written in the upper left-hand corner of their test sheets) first, so as to postpone revealing the difference (if any) between the responses of the two groups.

When you tally a student's score for "Correct Words," subtract his score on Section A from his score on Section B. For example, if the student says he thought he guessed three words correctly on Section A and five words correctly on Section B, his score for "Correct Words" is 5 - 3 = 2. If the student says he thought he guessed eight words correctly on Section A and three words correctly on Section B, his score is 3 - 8 = -5. Scores for "Correct Words" may range from -10 to +10.

When you tally a student's score for "Ability," again subtract his score on Section A from his score on Section B. For example, if the student thought his ability was "Excellent" (a score of 4) on Section A and "Poor" (a score of 1) on Section B, his score for "Ability" is 1 - 4 = -3. Scores for "Ability" may range from -3 to +3.

In either scoring column, a student who believes he did better on Section A than on Section B--i.e., who believes his ability declined--will have a negative score. A student who believes his ability improved will have a positive score. A student who believes his ability remained unchanged will have a score of zero.

After you have tallied all students' scores, find the total of all scores in both columns. (This will be tricky, since some of the scores will be negative. Add all the positive scores, and subtract all the negative ones.) Then find "N" for each group, i.e., the number of students in the group. Finally, for each group, divide "N" into the total in the "Correct Words" column and divide "N" into the total in the "Ability" column. The quotients will give the average changes in students' estimates of their ability. You can compare the averages for the two groups to see whether the experimental group (as a group, on the average) "improved" more than the control group as a consequence of having received positive feedback while completing Section B of the test.

C. Explanation of the Experiment: Now the students can be told that they were participants (subjects) in an experiment, even though they were not aware of that fact. Deception was used to conceal the experiment, and the "biomedical terms" are, in every instance, fictitious; no term on the list is a real word. Once the students have had enough tension-relieving time, you can turn their attention to the terms "control group" and "experimental group." These words may come up naturally as students ask why the experiment was conducted or why they were deceived. If given time to think back on the experience, the class will probably discover that the assistants did not speak to members of the control group, and some students may even begin to see the point of the experiment.

D. Assignment: If time remains you can begin the discussion suggested in Lesson 27. However, this is a good point to stop if you wish to give an assignment. There are several possible questions that students might write on, including those suggested in the next lesson. An obvious beginnning is to ask students to explain why one group was given information (even though it was false) and the other was not. Another question you may want to assign centers on the purpose of the experiment: What might a researcher investigate by using this experiment?

E. Discussion of the Results of the Experiment: There are two main topics to be included in this discussion. One is the purpose of the experiment, or the substantive nature of the investigation. The other is the method of inquiry, the social science laoboratory experiment (see Part F below).

On the substantive point, the issue being investigated is the degree to which a person's perception of himself is influenced by others reports about their perceptions of him. You may wish to be very brief on this since it is not central to the content of this unit, and the influence of others on our own behavior will be investigated later in this course. If you do spend time on the point, some questions that may be of use are the following.

1. What difference would you expect to find between the feelings of the experimental subjects and the feelings of the control subjects after this experiment? Why?

2. Do you believe that the opinions of others influence your ideas about your own worth? Do the results of this experiment support or not support your belief on this question?

3. If you think it is true that one's self-perception can be influenced by positive feedback, how might this fact be used in health care? Are there situations in which improving a person's attitude toward himself might protect or improve his health?

F. Discussion of the Method of Inquiry: The laboratory experiment you have conducted with your students as subjects illustrates several things that often happen in the use of this method of inquiry. One is the use of a control group and an experimental group (Part 1 below); another is the deception of the subjects (Part 2 below); a third is the result, which is an item of knowledge about human behavior which might be used to influence or control the behavior of others (Part 3 below).

1. Experimental Design: By asking questions such as the following you can encourage your students to think about the nature of this method of inquiry, and about the similarities and differences between this method and others the students have been introduced to.

a. What was the difference between the treatment of the control group and the treatment of the experimental group? (The experimental subjects received the "experimental treatment," i.e., positive feedback, or encouragement, from your assistants. The control subjects did not receive that treatment.)

b. What was the difference between the results for the two groups? (The experimental subjects may have shown higher confidence, on the average, in their ability to interpret the terms on Section B of the test.)

c. What conclusions can you draw from these differences between the two groups? (If the experimental subjects showed higher confidence, on the average, students might conclude that the encouragement these subjects received caused them to feel more confident of their ability to interpret the terms. Of course, your class' data may show no difference in confidence between the two groups, or they may even show higher confidence on the part of the control group.)

d. The control group and the experimental group were selected randomly, i.e., by chance. Why was this done? (In order to draw any conclusion about the relationship between the experimental treatment and the result, the inquirer must try to ensure that the only difference between the two groups is that one receives the experimental treatment and the other doesn't. If one group had been all male and the other all female, for example, then the sex difference would have to be considered as a possible contributing cause of any difference between the two groups' results. The experimental group and the control group must be "matched" for all characteristics that might conceivably affect the experimental result. One way to match groups is to draw them at random from a large population of subjects.)

e. Can we generalize our conclusions from this group of subjects to any larger population? (The answer depends on whether students believe the class is a representative sample of some larger population. In this respect, selecting subjects for a laboratory experiment presents exactly the same problems as selecting respondents for a questionnaire survey.)

f. What are the main differences between this method of inquiry and the method of field manipulation and observation? (In general, the inquirer has more control over his inquiry in the laboratory experiment. Students might compare this experiment with the study in which pseudopatients sought admission to mental hospitals. The pseudopatients had virtually no control over what happened in the mental hospitals; they had no way of ensuring that only their description of their fictitious symptoms affected the hospital staffs' decisions to admit and to release them.)

2. Deception of Subjects: Experimental subjects are often (but not always) told they are participating in one thing when they are actually participating in another. Deception is used for practical reasons, but it raises ethical as well as practical problems. The essential conflict is between the value of knowledge and the value of honesty, or truthfulness.

a. Why were the subjects deceived in this experiment? What would have happened if everyone had been told that this experiment was designed to find out whether subjects receiving positive feedback would feel more confident of their ability to interpret terms? What would have happened if everyone had been told that all the "biomedical terms" were fictitious? What would have happened if real biomedical terms had been used?

b. Is it ethical to deceive subjects? Under what conditions might it be ethical? Why is it ethical (or unethical)?

c. In an experiment several years ago, subjects were told to administer electric shocks to a person hidden from view in an adjoining room. As the experimenter encouraged the subject to increase the voltage and the subject turned up the dials on his control panel, screams of pain were heard from the adjoining room. Some subjects administered charges which they knew to be fatal, and some even kept administering charges after all screams from the adjoining room had stopped. In fact, there were no electric shocks, and the screams were feigned. But during this experiment all subjects were under great stress, and most subjects learned that, with very little encouragement from an "authority," they would willingly administer painful punishment to a person they had never seen before. Could this experiment have been harmful to some subjects? Was this experiment ethical?

d. It has been suggested that people develop a basic distrust of social science when they discover that social scientists may deceive them for the purpose of acquiring knowledge. Now that deception has been used on the students in this class, could the same thing happen here?

3. Acquiring Knowledge That Can Be Used To Control People: This experiment raises another value conflict, between the value of knowledge and the value of individual freedom. The conflict is complicated, but you may wish to explore it with your class, using questions such as the following.

a. Could the results of the experiment that has been conducted in class be used to influence or control the behavior of others? How might this knowledge be used by advertisers, politicians, doctors and other health workers, teachers, clergymen, parents? Could anyone use this knowledge to cause you to do anything that violates your own priciples?

b. The "electric shock" experiment showed that people could easily be led, by a person they regarded as an "authority," to inflict painful and even fatal punishment on complete strangers. could this knowledge be used to influence or control the behavior of others? How might it be used by advertisers, politicians, etc.? Could anyone use this knowledge to cause you to do anything that violates your own principles?

c. If an experiment might produce knowledge that could be used to influence or control the behavior of others, is it ethical to conduct the experiment? Under what conditions? Why, or why not?

d. If a citizen wants to conduct such an experiment, is it ethical for anybody to stop him? Under what conditions? Why or why not?

ASSIGNMENT:

Assign the reading, "Air Pollution," in the Student Text. Students will be doing research on this topic in the next six lessons.

NAME ______________________________

TEST OF ABILITY TO INTERPRET BIOMEDICAL TERMINOLOGY (Section B)

This is a second part of the test; the instructions are the same, and you will not be graded on the results. Write in the space to the right of each term your best estimate of the meaning of the term. If you do not know the meaning, guess. Take as much time as you need. When you have done this, answer the questions at the bottom of the page.

1. carcinemia ______________________________
2. anticarbonetic ______________________________
3. barocephalic ______________________________
4. flagestuary ______________________________
5. salivitis ______________________________
6. hematrophic ______________________________
7. kilophobia ______________________________
8. neurosmecter ______________________________
9. oncodilation ______________________________
10. paralastic ______________________________

Of the above ten terms, how many do you think you guessed correctly or at least guessed within the general idea of the term? _____

How do you judge your own ability to estimate the meaning of biomedical terms, now that you have had some experience in doing this?

Excellent______Good______Fair______Poor______

LESSONS 28 through 33: RESEARCH ON AIR POLLUTION

SYNOPSIS:

In these six lessons students plan research projects on air pollution, carry out the projects, prepare reports on their work, present their reports and discuss the results of the class' work.

OBJECTIVES:

The student will formulate a question about air pollution and identify a level of analysis and a point of view with which the question can be investigated.

The student will design a research project by which to seek an answer to his question using at least one method of inquiry the class has studied.

The student will carry out a research project he has designed.

The student will prepare a report describing his question, the method used to research it and the results of the research.

The student will give reasons why it was or was not appropriate to use the method of inquiry he used in researching the question he started with.

STUDENT TEXT:

Reading: A Simulation of Health and Environment

SUGGESTED TEACHING PROCEDURES:

The allocation of class time among the various tasks students have to accomplish during these six lessons is a matter to be decided by you and your class. The following consists of suggestions for carrying out each of these tasks. The order in which the suggestions appear is approximately the same as the order in which students will encounter the tasks. We urge you to read through these suggestions before you undertake to schedule the six days' activities.

A. Planning Research Projects: Careful thought during this first phase of the exercise will be repaid by smoothly functioning, interesting and productive work in the later phases.

1. Discussion of the General Subject: You might begin with a class discussion of air pollution. In later Biomedical Science lessons in Unit I students will set up air pollution studies in the community and analyze the results of these studies; they will study the meteorological phenomena that cause temperature inversions; they will study the nature, sources and effects of various types of pollutants; and they will study two diseases that can be caused or aggravated by air pollution, namely, chronic bronchitis and emphysema.

In this course students will have the opportunity to study the "human" side of air pollution, from any or all of the seven points of view that have been introduced in previous lessons. To begin with, the class might discuss the many and various ways in which students could study air pollution.

a. On which level(s) of analysis do students think it would be interesting to study air pollution? The level of the individual? The family? The community? An area encompassing several communities with a common air pollution problem? The state? A region of several states with a common air pollution problem? The whole society?

b. From which point(s) of view would it be interesting to study this problem? Interaction with environments? Distribution of resources? Allocation of responsibility? Institutions and institutional behavior? Shared ideas and traditions? Values? Thinking, emotion and motivation?

c. What method(s) of inquiry might be used in this study? Participant observation? Questionnaire survey? Role-playing? Book research? Unstructured interviews? Data manipulation? Field manipulation and observation? Nonparticipant observation? Laboratory experiment?

d. Which dimension(s) of health are related to air pollution? Opinions, attitudes and beliefs about health and disease? Roles and relationships among patients, healers, family members and others? Medical technology? The causation, prevention, detection and treatment of disease?

2. Planning of Group and Individual Projects: Students should be encouraged to plan and carry out original inquiries without fear of failure. The student's primary objective should be to define his problem carefully and to design an inquiry that fits the problem thus defined. If the results of the inquiry are poor or nonexistent, the student should be encouraged to think about why and, perhaps, to redesign his inquiry. No one should be deterred from taking a first step by fear that he will be penalized for falling down.

The planning of projects might be done in two phases: one phase in which the whole class discusses students' suggested projects, and one phase in which individual students or groups of students prepare written proposals. Depending on the quality of the proposals, another round of discussion and another written proposal might be advisable.

The Background Information section following these Suggested Teaching Procedures outlines several kinds of projects students might undertake.

3. Organizing Class Time: When all students have prepared acceptable proposals, you and the class should work out together a schedule for use of the remaining class time in this sequence of lessons. Try to reserve at least one class period at the end of the

sequence for general discussion and evaluation, and one class period immediately before that for reports.

B. Doing the Research: You may have at least one free day in the middle of the sequence. How it is used will depend entirely on the nature of the projects the students have undertaken. Many projects can be worked on in class; these include projects using role-playing, book research (if you have resources in the classroom--otherwise it might be necessary to reserve some library time), data manipulation and laboratory experiment. If a group is carrying on a role-playing exercise or a laboratory experiment, the rest of the class should serve as observers.

It may be that some projects will be finished before the sequence of lessons is completed. For example, a student or group of students might complete unstructured interviews, survey research, or participant or nonparticipant observation, and be ready to report before the time you have set aside for reporting. One or two projects of this nature might be reported on early, and the students who have carried them out might then make use of the class' evaluation of their efforts to redesign their projects and carry out the revised projects.

Some class time might usefully be devoted to hearing guest speakers. Among the types of speakers that might contribute to students' learning are representatives of oil companies or automobile manufacturers, public officials whose work includes monitoring or controlling air pollution, public officials whose work includes drafting laws for the control of air pollution, and spokesmen from groups which advocate radical controls in the interest of protecting the environment.

C. Preparing and Presenting Reports: Some students might be able to present their results of their work in written, tabular or graphic form. To the extent possible, you should have such reports reproduced so that you can distribute them to the class. The reading of one or more reports might be made a homework assignment in preparation for the final discussion.

As noted above, some projects can be carried out in front of the class--role-playing and laboratory-experiment projects. Students or groups who conduct such projects might be excused from preparing a separate report to the class. They should, however, be prepared to describe their conclusions and, if you think advisable, to describe an improved way of doing the project.

In general, students should be encouraged to present their results in a variety of formats. Thirty collages, thirty book reports or six panel discussions should be avoided.

D. Discussion: Students should be encouraged to discuss both their findings and the ways in which they went about obtaining them. You might begin by asking the class to summarize what has been learned about air pollution, to review the substance of the class' reports and, if at all possible, to generalize from these reports.

Students should also discuss again the question listed in Part A.1. above. On what levels of analysis is it interesting or useful to study air pollution? From what points of view? Using what methods of inquiry? In relation to what dimensions of health? The class should be able to arrive at the generalization that the way one goes about studying a particular problem should depend on the nature of the problem.

In addition, students should be encouraged to discuss what went wrong with their projects. Analysis of their mistakes will probably lead to some useful observations about the importance of defining one's problem narrowly enough to make it workable, the necessity of defining it carefully, so as to be sure one knows exactly what it is one is trying to find out, and the necessity of designing one's inquiry so that it produces an answer to the question one started with and not some other question.

ASSIGNMENT:

At the end of this sequence, assign the reading, "A Simulation of Health and Environment," in the Student Text.

BACKGROUND INFORMATION:

The following is an outline of projects that individual students or groups of students might undertake. There are many other possibilities, and students should be encouraged to design their own projects. Note that some of the suggestions below envision visits by students to offices, factories and other places. If such visits are made on school time, you will of course need to make any advance arrangements required by state or district regulations for field trips. In addition, whether such visits are made on school time or on students' own time, you can probably help the students by compiling a list of places that might be visited, getting the agendas of public meetings, contacting people in the places to be visited, etc.

I. Distribution of Resources:

A. Community:

1. Data Manipulation: Obtain and use data on cars, trucks, ships, trains and other sources of pollution in the community. Obtain and use data on an industrial plant in the community: profits, amount spent on pollution control, amounts paid in penalties for polluting.

2. Role-Playing: Play the roles of members of the board of directors of an industry which faces fines for polluting, but which would find it cheaper to pollute and pay the fines than to control the pollution.

3. Nonparticipant Observation: Visit an industrial plant and observe (a) sources of air pollution and (b) mechanisms used to control pollution. (Note that students who go on "guided tours" may be more like participants than nonparticipants in the organization they observe, in the sense that they may see and hear only what the organization wants them to see and hear. If students undertake this sort of project, it might be a good idea for them to prepare by developing a list of things to look for and questions to ask, so that when they report they will be describing the fruits of their own inquiry and not merely giving a second-hand version of the same speech anyone else would hear on the guided tour.)

B. Society:

1. Data Manipulation: See I.A.1. above.

2. Role-Playing: See I.A.2. above.

3. Book Research: Find out how much is spent on pollution control by industry and compare to profits and to penalties paid.

II. Allocation of Responsibility:

A. Community:

1. Questionnaire Survey: Find out what people in the community think, and how they feel, about legal control of air pollution. What sources should be controlled? What penalties should be imposed for violations?

2. Role-Playing: Play the roles of members of a city council, which must weigh (a) possible loss of jobs and tax revenues if industry is driven away by stringent controls, (b) possible loss of business if visitors (tourists, conventions) are driven away by pollution, (c) possible detriment to community health due to pollution. (This works best if the council is acting in an emergency situation, e.g., an outbreak of fatalities in chronic respiratory disease cases, brought on by worsening pollution.)

3. Nonparticipant Observation: Visit a public meeting of a governmental agency discussing air pollution or a related issue.

B. Society:

1. Role-Playing: Play the roles of members of a Congressional committee trying to draft legislation for the control of pollution, taking into account the desires of (a) industry, (b) environmentalist groups, (c) citizens who feel they need to drive cars and (d) agencies responsible for serving the health needs of citizens.

2. Book Research: Find out what federal laws exist for the control of air pollution and what effects they have had, if any.

III. Institutions:

A. Family:

1. Participant Observation: Observe and record things that family members do which pollute, and things they do for the purpose of reducing or avoiding polluting the air. (Note that there is both direct pollution, such as burning trash, and indirect pollution, such as using electricity generated by polluting power stations. Students might study either or both.)

B. Community:

1. Participant Observation: See III.A.1. above.

2. Nonparticipant Observation: Visit businesses, pollution monitoring stations, governmental offices, TB and Respiratory Disease Association offices or other places where people work in organized settings, and observe and record behavior related to air pollution.

3. Field Manipulation and Observation: Go to public places where people ordinarily smoke, and ask them please to refrain from smoking. See what happens.

IV. Shared Ideas and Traditions:

A. Individual, Family or Community:

1. Unstructured Interview: Find out what people think and how they feel about air pollution. Do they think economic problems are more urgent than ecological problems? Are they worried about the effects of air pollution on their health? Are they conscious of their own contributions to air pollution? Do they attempt to limit their contributions?

B. Society:

1. Book Research: Find out about the traditional American way of thinking about the wilderness. Do writers think there is such a tradition? Do they think it is related to pollution problems? Do they identify other "national characteristics" as possible causes of air pollution?

V. Thinking, Emotion and Motivation:

A. Individual, Family, Community or Society:

1. Role-Play: Play the roles of persons who oppose air pollution and persons who do not; the opponents should be trying to motivate the others to drive less, stop smoking, join a car pool, use public transportation, vote for anti-pollution candidates, etc. The others should be basically unconcerned about air pollution because an individual can do nothing, because it is not really a threat to the individual, or for other reasons students may think of; or they should oppose air pollution control for economic or other reasons.

VI. Values:

A. Individual or Community:

1. Questionnaire Survey: Find out what people believe is right and wrong with regard to various sources of pollution, legal controls, etc.; also ask questions to find out about their driving habits, smoking habits, etc., and compare these with stated values to see whether respondents practice what they preach.

2. Unstructured Interview: Interview people to find out the same things, following the informants' leads rather than asking specific questions.

VII. Interaction with Environments:

A. Community or Society:

1. Book Research: Find out about the sources of pollution; the damage pollution does to people, animals and plants; how the pollution is dissipated or why it is not dissipated by natural air currents; etc. Note that research along these lines will be supplementary to the Biomedical Science lessons on air pollution. You might want to review the air pollution sections of the Science Student Text in order to help students determine what they want to investigate.

LESSON 34: A SIMULATION OF HEALTH AND ENVIRONMENT

SYNOPSIS:

In this lesson students participate in two rounds of a simulation showing how families with various health problems might go about finding healthful environments. Students then discuss the outcome of the simulation and the relationship between the simulation and real social processes. As a homework assignment, students write on ways of improving the simulation and on the use of simulation building as a method of inquiry.

OBJECTIVES:

The student will participate in a simulation of families seeking a healthful environment.

The student will rank three environments for healthfulness in relation to six different health problems.

The student will identify elements of reality imitated in the simulation.

The student will identify elements of reality not imitated in the simulation.

SUPPLIES:

One die for each five students in the class, or one bag or box for each five students to draw numbered slips of paper from.

STUDENT TEXT:

Reading: A Simulation of Health and Environment

Assignment: Models

SUGGESTED TEACHING PROCEDURES:

Note: "A Simulation of Health and Environment," in the Student Text, should be read before you read these suggestions for using the simulation.

A. Preparing for the Simulation: Divide the class into groups of five and seat each group around a desk or small table. Each group needs one "game board" (found in the Student Text) and one random number generator (either one die or a bag or box from which to draw slips of paper numbered one through six). Each student participating needs a token (a small slip of paper with the participant's "family name" written on it) and a copy of the rules (found in the Student Text).

If there are extra students, they can sit out the first round of the simulation as observers (one round should take only a few minutes) and then replace other students as participants during the second round. A student who participates in both rounds should not represent the same family twice.

B. The Simulation: Each group should play two rounds of the simulation. At the end of each round, a member of the group should write down which family ended up in which environment. This information will be used in the discussion following the second round.

C. Discussion of Scoring: This part of the discussion should be considered as preparation for the second part, in which students discuss the simulation itself as a model of real social processes (Part D below). The primary objective of discussing scores is to ensure that students are aware of the real events that are simulated, or imitated, in the "game," so that in the later discussion they can suggest improvements in the simulation. Accordingly, during the first part of the discussion you should take note of students' comments that bear on the fidelity of the simulation to the real world (e.g., "It isn't really this simple," or, "How does a family really decide which is the best environment?").

1. Determining Scores: To the extent that students are interested in knowing who "won the game," their interest will motivate a discussion of scores. The instructions for the simulation provide no method of assigning scores. They do point out that the objective for each participant is to get his family to the most healthful environment possible. If there is sufficient motivation, you might display on the chalkboard a grid like that shown below, and suggest that the class assign each family a score for each environment. Scores should range from zero (for high likelihood that one family member will die or that the family will disintegrate) to ten (for the best environment of the three on the game board). During the discussion of scores, encourage students to think about all the characteristics of each environment which might affect the health of these families. (The Background Information section following these Suggested Teaching Procedures suggests scores--they are highly arbitrary--and lists environmental characteristics that might affect the health of the family.)

	FAMILY					
ENVIRONMENT	ADAMS	BROWN	CLARK	DANIELS	EDWARDS	FORD
STURDLEY ESTATE						
HUMBLEBURG						
BUSTLE CITY						

2. Characteristics of Reality Included in the Simulation: During the discussion of who won and why, students may make a number of observations that bear on the fidelity of the simulation to the real world. Some of these are listed and briefly commented on below.

a. An environment may be healthful for different families for different reasons. (For example, Bustle City is good for one family because it offers sophisticated medical facilities and high-paying jobs, and good for another family because it offers lots of action and excitement.)

b. A family might find two environments equally healthful, or nearly so. (For example, the middle-aged couple might do as well in Humbleburg as on the Sturdley Estate.)

c. The best environment for one family might be the worst for another. (For example, Bustle City is best for several families, but worst for the middle-aged couple.)

d. A family might have to consider several characteristics of an environment before deciding to move into it. (For example, the family in which the breadwinner has chronic bronchitis must consider the altitude as well as the level of air pollution; at altitudes above 7000 feet [about 2.4 km] the chronic bronchitis victim would have great difficulty getting enough oxygen. The family with a member on hemodialysis must consider the availability of high-paying jobs as well as the availability of sophisticated medical facilities.)

e. Some families might have to settle for unhealthful environments because others got to the healthful ones first. (For example, the family whose breadwinner has chronic bronchitis might have to settle for Bustle City or the Sturdley Estate, if the middle-aged couple gets to Humbleburg first; the family whose breadwinner suffers anxiety when working full time might have to settle for Humbleburg or Bustle City if the middle-aged couple gets to the Sturdley Estate first.)

f. The rich families can get around faster than the poor ones.

g. Chance occurences can make the rich richer and the poor poorer, or they can equalize the two.

D. Discussion of the Simulation and Reality: The remainder of the class period should be devoted to discussion of the relationship between this simulation and the real processes by which people decide what is the most healthful environment for them and get to that environment. If you have noted students' comments on this subject, these should serve as the starting point for this discussion. Encourage students to think about the difference between the simulation and reality by asking such questions as the following. (The range of possible responses is indicated in parentheses.)

1. What happened in this simulation that doesn't happen in the real world? (Healthfulness of the environment was the only criterion for deciding where to live. All families were fully informed of all the environments available. It was just as easy for a family to get to the out-of-the-way environment [the Sturdley Estate] as it was to get to the city. Even the poorest families had enough money to move, though slowly. The rich families got just as many bad breaks as the poor families.

2. What happens in the real world that didn't happen in this simulation? (People worry about many other things besides the healthfulness of the environment: school facilities for children, nearness of relatives, the climate, racial and ethnic discrimination, etc. There are always more than three places to go. There are always more than five families on the move. Moving from one place to another is often a terrible strain, and may adversely affect the health of some families. There are welfare agencies, religious groups and other organizations that help people who are poor, especially if they have health problems. There is more variety in the health problems of real families.)

3. What could people learn about health by participating in this simulation? (The simulation illustrates the variety of environmental characteristics that can affect the health of people who live in an environment. Among these characteristics are the level of pollution, the availability of oxygen in the air, the level of social stimulation, the difficulty of getting around for a handicapped person, the availability of health care and the availability of jobs.)

4. This is a simulation of the process by which a family selects and moves to the most healthful environment available. As a simulation of this real social process, how could it be improved? (This question leads into the homework assignment suggested below. Students may note that the process of deciding which environment is the most healthful takes place entirely in the participants' heads; the simulation might be improved by assigning points to various characteristics in each environment--e.g., from zero for heavy air pollution to ten for no pollution--and requiring the family with a bronchitis patient, for example, to move to an environment with a "ten" for pollution and to forfeit points for moving to an environment with a lower pollution score. Students may also note that the process of accumulating and spending money is only grossly represented in the rules of the game; the simulation might be improved by using money--e.g., by giving each family a fixed income [one payment each turn, for example] and requiring the family to accumulate a certain amount of money before moving to a certain environment. Students might also suggest including other things they have identified as happening in the real world but not in the simulation--availability of schools, nearness of relatives, climate, racial and ethnic discrimination, etc.)

ASSIGNMENT:

Direct students' attention to the assignment, "Models," in the Student Text. The assignment includes two suggested writing topics: (1) either improving or replacing the simulation the students have participated in, and (2) discussing the use of models as a method of inquiry. If each writing topic is assigned to at least part of the class, the students' work can serve as the basis of discussion in the next lesson.

BACKGROUND INFORMATION:

Below is a suggested scoring system for the game. An explanation of the scores follows the table. All scores are arbitrary.

	FAMILY					
ENVIRONMENT	ADAMS	BROWN	CLARK	DANIELS	EDWARDS	FORD
STURDLEY ESTATE	2	0	10	2	10	5
HUMBLEBURG	5	5	2	5	8	10
BUSTLE CITY	10	10	8	10	2	5

The Adams Family: Bustle City is the best environment for these people. The breadwinner can find a job, get around in a wheelchair, indulge his cultured tastes and get physical therapy. Humbleburg would be inadequate because, although it offers a business opportunity, it has no hospital and no symphony or art gallery. The Sturdley Estate offers no work for a person who has trouble getting around, and also no medical facilities and no cultural activities.

The Brown Family: Bustle City is the best environment for this family because it affords the best medical facilities for the person on hemodialysis and because it is most likely to provide a high-paying job for the breadwinner. Humbleburg would be inadequate because of the scarcity of medical facilities and the lack of high-paying jobs. The Sturdley Estate would be the worst because it is far from medical facilities of any kind and provides no work for a business executive.

The Clark Family: The Sturdley Estate is the best environment for this family because it does not require full-time work and would leave Ms. Clark time to write music and thus prevent anxiety. Bustle City is not bad, since it probably offers part-time jobs, but the environment might be distracting to the composer. Humbleburg offers only a full-time job, and would therefore be a poor choice.

The Daniels Family: The best environment for these people is Bustle City, because of the bustle. Humbleburg would be inadequate because there are few people there and very little happens. The Sturdley Estate would be even worse because there is nobody there and nothing at all happens.

The Edwards Family: The Sturdley Estate is the best environment for these people. Nothing ever happens there, and the work is routine and not intellectually or physically demanding. Humbleburg would be a pretty good environment for these people, too. Bustle City would be bad because it is full of everything that makes these people sick.

The Ford Family: The best environment is Humbleburg, which has little air pollution, plenty of oxygen, a business opportunity that suits the breadwinner's needs, and a doctor in case of an acute bronchitis attack. Bustle City is inadequate because of its pollution. The Sturdley Estate is inadequate because of its altitude: above 7,000 feet (about 2.4 km) there is so little oxygen in the air that the chronic bronchitis victim would have great difficulty getting enough of it into her lungs; she would probably be unable to adapt to the altitude even over a long period of time, because her body is already using much or all of its reserve oxygen-carrying capacity even at sea level.

LESSON 35: MODELS AND SIMULATIONS

SYNOPSIS:

In this lesson students discuss ways of improving the simulation played in the preceding lesson, and discuss the use of simulation-building as a method of inquiry. As a homework assignment, each student designs an ideally healthful environment for one family with a given health problem.

OBJECTIVES:

The student will define a model as a representation or imitation of reality and give examples of models.

The student will define a simulation as a working model and give examples of simulations.

The student will describe at least one possible improvement in a simulation of the process of (1) deciding which of several given environments is most healthful for a family with a given health problem, and (2) getting the family to the most healthful environment.

The student will describe at least two possible uses of simulation-building as a method of inquiry.

EQUIPMENT:

Several different kinds of maps (used to illustrate differences among models)

STUDENT TEXT:

Assignment: Designing an Ideal Environment

SUGGESTED TEACHING PROCEDURES:

There are several things that should be discussed during this class period, but there is no particular order in which they must be discussed. The order in which topics are presented below is purely arbitrary.

A. Models and Simulations: Be sure that the concept of descriptive models and the concept of simulations as one type of descriptive model are clear to students. A model is a representation or imitation of a real object or process; what the model represents may be physical, chemical, anatomical, physiological, psychic or social, and it may be on any level of analysis: a molecule, an organ, an individual organism, a community, a society, the whole earth and all that is on it, the solar system, etc. The model may be simpler than the reality it represents.

A descriptive model is one that is used to show how things are, or how one thinks things are. (A prescriptive model shows how one thinks things ought to be.)

A descriptive model may be static or it may be a "working model." A flow chart describing the roles and relationships in an organization is a static model; so is a wooden ship in a bottle; so is a map. The simulation in the last lesson is a working model; so is a model airplane that flies; so is a hand-cranked model of the solar system in which planets go around the sun and moons go around the planets. In this course, a working descriptive model is called a simulation.

During this part of the discussion students should talk about descriptive models they have used in Science and in Mathematics. Some of these models, such as the bell-jar model of the lungs, are simulations. Others, such as graphs and tables of data, are static descriptive models. Mathematical models--equations representing real physical processes--may be considered simulations, or "working models," in which the "moving parts" are the variables, one or more of which can be manipulated to cause changes in other variables.

During the discussion you might ask students to talk about other descriptive models they use, or know that other people use, in their daily lives. Maps, charts, diagrams and three-dimensional models that don't move are static descriptive models. (Some may be prescriptive models; for the purpose of this lesson, students should not dwell on the uses of prescriptive models, but they should be aware of the difference between a model that is designed to show how someone thinks things are and a model that is designed to show how someone thinks things ought to be.)

Many games can be thought of as simulations of real social processes. Board games are often simulations (though not necessarily very good ones) of the economy, of war, of political systems and so on. All kinds of three-dimensional representations of things are simulations, as long as they have moveable parts; many toys are very good simulations of real things.

B. What's Included and What's Not: A descriptive model, by definition, includes some characteristics of the real thing or process and excludes others. (A sophisticated model might include all known characteristics of the real thing.) The characteristics that are included determine how well the model describes the reality and what the model is useful for (if it is useful at all). The reason many models are useful for inquiry is that they omit what the model-builders consider to be nonessential features of real situations, thus enabling people to concentrate on the essentials. The main difficulties in the use of models are (1) that people often disagree over what is essential and what is not, particularly in social processes, (2) that people are often ignorant of many features of real situations and therefore may unwittingly leave out important features and (3) that people may be misled by models that leave out important features of the real situation.

One simple type of model that can be used to make these points is the map. Some maps include contour lines showing the altitude of dry land and the depth of water; others give no indication of altitude. Some include political boundaries; others do not. Some show streets and roads; others do not. Some are "out of date," that is, they show features that are no longer on the landscape or omit features that have been added since the maps were drawn. Some maps (e.g., early explorers' maps of North America) are simply wrong. Finally, maps are drawn on all different "levels of analysis," from a city or even a small part of a city, up to and including the whole earth or an earthling's-eye view of the night sky. A discussion using maps you have in the classroom should suffice to demonstrate the importance of what's included in the model and what's not. What is a "good model" depends largely on the purpose it will serve. A political map of the Western hemisphere is of no use to a person who wants to know how to get to the other side of town without driving on a freeway. A freeway map of the city is of no use to a person who wants to know what is the shortest route to Mexico City.

C. Criticism of the Simulation Used in Class: One part of the homework assignment asked students to suggest improvements in (or a replacement for) the simulation they have completed. In order to discuss improvements it is necessary to be clear about the purpose for which the model is to be used. The assignment, "Models," in the Student Text says the simulation is designed to show "the way a family finds a healthful environment." The simulation includes both the process of deciding which environment is the most healthful (which takes place entirely in the participants' heads) and the process of getting to that environment (which takes place on the game board). Students' suggestions can be directed at either or at both of these objectives; in discussing a student's suggestion, be sure everyone understands which objective the student has in mind.

How you conduct this discussion, and its length, will depend on what suggestions the students have produced. Several possibilities are mentioned, in a general way, in the assignment; others are discussed in the Suggested Teaching Procedures for the preceding lesson (Part D). If any students have suggested major changes in the simulation, it would be advantageous to allow them to run the revised simulation in the classroom, if time allows.

D. Model-Building as a Method of Inquiry: The homework assignment asked students to evaluate the designing of simulations as a method of inquiry into social processes. If students have followed the suggestions given in the assignment, they should have determined that simulations can be used to show what the inquirer thinks is going on, before he has inquired; to help the inquirer decide what he needs to inquire into; and to show other people what he has learned through other methods of inquiry. Simulations cannot be used to get data about what really occurs. A person who draws maps can draw a map to show what he thinks a landscape looks like, to help him identify places where there may be things he doesn't know about and to show the things he has found (by looking) to be on the landscape. But he cannot learn what is on the landscape by drawing a map. (He might look at other people's maps, however. He would thus be able to find out what other people think is on the landscape, though what he learned would be subject to all the limitations inherent in second-hand information.)

E. Preparation for the Assignment:

1. Modifying the Assignment: The assignment (see below) asks each student to write about one of the families in the simulation. Assign equal numbers of students to each family. You might add new families with different health problems: one with a member who is blind, one with a member who is mentally retarded, one with a member who has coronary heart disease, one with a member who is overweight, and so on. If possible, use health problems the students have suggested during the discussion. Add one group for each new family. At least three students should study each family (students will work in groups in the next lesson), so the maximum number of families is one-third the number of students in your class.

2. Groundwork for Evaluation: In the remainder of this unit, beginning with this assignment, students develop their own proposals for health care (first for an imaginary family and later for their own community) and then design, carry out and report on research projects in which they learn how their proposals relate (if they do) to the real health needs of their community. This entire sequence of ten lessons is, in terms of the concepts and skills students will be using, a review of the unit. It is also a continuous and developing sequence of activities which you can use for criterion-referenced evaluation. Not only can students use these lessons to follow up on previous activities, but within these lessons you can repeatedly point out to students where their work needs improvement and then, on the next activity, look for improvement and make further suggestions. We recommend that you use criterion-referenced evaluation in this sequence and make the sequence a component of your evaluation strategy for the unit. If you decide to do so, students will benefit from a short explanation of the evaluation process as you are introducing this assignment.

ASSIGNMENT:

Refer students to the assignment, "Designing an Ideal Environment," in the Student Text (modified by the addition of more families as you see fit). Note that the assignment lists several questions under each of seven points of view. It might be well to emphasize the point made in the assignment, that these questions are intended to indicate the range of details students might write about in completing the assignment. If students feel that they are required to answer every question suggested in the assignment, the questions may be more discouraging than helpful.

LESSONS 36 and 37: DESIGNING FAMILY HEALTH MAINTENANCE PROGRAMS

SYNOPSIS:

In these two lessons students work in groups. Each group develops a realistic description of a family with a given health problem, and a realistic health maintenance program for that family. As a homework assignment, students begin designing an ideal health maintenance system for their community.

OBJECTIVES:

The student will describe a family's health problem from seven points of view.

The student will describe a family's health problem in terms of four dimensions of health.

The student will consider seven points of view and four dimensions of health in designing a practical family health maintenance program for a family with a given health problem.

STUDENT TEXT:

Reading: Dimensions of a Family Health Maintenance Program

Reading: Designing a Community Health Maintenance System (optional)

SUGGESTED TEACHING PROCEDURES:

In these two lessons students meet in groups to devise realistic health-maintenance programs for the families they have been writing about and to prepare reports, and then the groups report to the class. The amounts of time allotted to these various activities should be determined by you and the class.

A. Preparing for Group Work: Each group consists of all the students who have written about one family. If you have used only the families that were included in the simulation, there will be five groups; if you have added other families with different health problems, there will be more. Before the class breaks up into groups, describe the group task and answer questions.

Each group is to combine the group members' writings on the homework assignment, "Designing an Ideal Environment," to produce a realistic description of a family with the health problem assigned to the group. Then the group is to devise a realistic health maintenance program for that family. This is not the same as an ideal environment, but the individual students' work on ideal environments should have given them some ideas about what should be included in a realistic program of health maintenance. In designing the program, the group should consider (1) all seven points of view described in the homework assignment, (2) all members of the family the group has described and (3) all four dimensions of health. The homework assignment did not mention dimensions of health, but there is a short reading, "Dimensions of a Family Health Maintenance Program," in the Student Text, which all students should read before the group work begins.

B. Group Work: You and the class should work out a schedule for completing the different aspects of the group assignment. Each group should know how long it has (1) to prepare a description of the family, (2) to devise a practical health-maintenance system for the family and (3) to prepare a brief report to the class on the family and the practical health maintenance system. The group work should occupy at least the remainder of the first class session in this sequence and possibly some of the second session; the length of reports required should be adjusted accordingly, so that all reports can be given during the second class session.

C. Reports: Before the groups begin giving their reports, inform the students that their next task will be to design another health-maintenance system, but this time on the community level of analysis. In preparation for this task, all students should take notes on the group reports, compiling a record of all the things the class as a whole has thought of which might be included in a community health maintenance system.

ASSIGNMENT:

Each student is to work independently toward construction of a community health maintenance system. You have considerable leeway in shaping the assignment. You should specify that students write about their own community--a community they are familiar with, and whose health problems they know something about. However, you might require any level of progress in this assignment, depending on how much you think students can do without getting frustrated. The simplest accomplishment that might be expected is a list of all the things students have heard from the group reports which they think might be included in a community health maintenance system. To make the assignment more demanding, each student can look at the reading, "Designing a Community Health Maintenance System," in the Student Text, and consider all seven points of view or all four dimensions of health or both of these. (The reading can be used in conjunction with the group work in the next lesson if it is not used in this homework assignment.) If you refer students to the reading, a more complete list of things that should be included in a community health maintenance program can be developed. Beyond that, students can be asked to describe an organization for coordinating all these things, including an allocation of responsiblity--an authority structure--within the community of health workers of all kinds.

Note: Your class might represent more than one community. If it does, they can either work on health maintenance for their particular communities, or on health maintenance for the larger community of which all students are members. If students come from several urban neighborhoods, several suburban areas, several rural areas or some combination of these, then each of these smaller communities might be the focal point of some students' work. However, it is probably better not to divide the class in this way unless (1) there are sufficient students from each smaller community to make up a group that you think will be large enough to work well, and (2) the smaller communities are different enough to have obviously different health needs. Even if the class meets these criteria, you may prefer to have all students work on health maintenance for the larger community of which all students are members--a more demanding task, and one requiring more synthetic thinking.

LESSONS 38 and 39: DESIGNING A COMMUNITY HEALTH MAINTENANCE SYSTEM

SYNOPSIS:

In these two lessons students work individually, in groups or as a class to generate one or more designs for a health maintenance system for their own community.

OBJECTIVES:

The student will describe his community's health needs from seven points of view.

The student will describe his community's health needs in terms of four dimensions of health.

The student will consider seven points of view and four dimensions of health in designing a health maintenance system for his community.

STUDENT TEXT:

Reading: Designing a Community Health Maintenance System

SUGGESTED TEACHING PROCEDURES:

These two lessons have been set aside for discussions in preparation for the following six lessons. In these two lessons students will produce a plan for a health maintenance system, or for parts of such a system, in their own community. In the following six lessons they will design and conduct research projects on aspects of their plan about which they want more information.

The discussions in these two lessons can take any of several forms. Students should use the last homework assignment as a starting point, and should consider the questions raised in the reading, "Designing a Community Health Maintenance System," in the Student Text. Beyond that, students can work individually, in groups of any size, or as a class.

During these two lessons and the six lessons to follow, students should be encouraged to build on the results of research projects they have done previously. These projects include the questionnaire survey on people's attitudes toward health (lesson 3-6), writing and role-playing on medical technology (lessons 10, 11), book research on health careers (lesson 12-15), unstructured interviews on the effects of emotional stress on physical health (lessons 17, 18), data manipulation and group work on coronary heart disease (lessons 19-21) and student-designed research projects on air pollution (lessons 27-32).

The following consists of suggestions for several kinds of student work during these two lessons. You should feel free to pick and choose from among these suggestions and to add any other activities that you think would be interesting and useful to students in preparation for the next six lessons.

A. Deciding Where To Begin:

1. Using the Results of Previous Work: You might begin the first of these two lessons with a class discussion in which students talk about previous projects that could be used as a basis for work on a community health maintenance system. In any of the projects listed above, did any student feel that he was getting into something important or interesting and that he didn't have enough time to finish it? Did any student find any other student's or group's work particularly interesting and worthy of further thought? Were any of these projects particularly appropriate to the students' own community?

This line of questioning can identify one or more ideas that individual students, groups of students or the class as a whole would like to do more work on. Interested students should spend the remainder of these two lessons designing a part of a community health maintenance system--the part related to the previous research that these students found interesting. For example, if students want to do more work on people's attitudes toward health, they might design a health education system. If they want to do more on controlling the uses of medical technology, they might try drafting laws for achieving that purpose locally. If they are interested in particular health careers, they might try to design a system whereby the community could make the most efficient use of health workers in those careers. (Where should these people work? Should they be in a central location or spread throughout the community? Why? Should they go out looking for clients or let the clients come to them? Why? How should they coordinate their activities with those of other health workers in the community?) If students are interested in the influence of emotional stress on

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physical health or in the prevention of coronary heart disease, they might design an educational program on either of these subjects. If they want to do more work on air pollution, they might try to devise a system for controlling air pollution in the community.

2. Using Particular Points of View: The reading, "Designing a Community Health Maintenance System," presents questions that might be asked from each of the seven points of view students have used. Individual students or groups of students might find one of these questions particularly interesting or particularly relevant to your community. Interested students could translate any one of these questions into a proposal for a particular component of a community health maintenance system, describe the proposal and prepare an argument justifying its implementation.

3. Studying Particular Dimensions of Health: The reading also presents questions on each of the four dimensions of health. Again, students or groups of students might want to start from one of these questions, and design and justify a component of a health maintenance system for their community.

4. Designing a Whole System: Individual students, groups of students or the class as a whole might prefer to spend these two class periods working toward a unified plan for a complete health maintenance system in their community. This is a problem of a different order from the problems discussed above. Students who are interested should not be discouraged from working on it, but they should be aware that they will have to concentrate on more abstract problems; they will have to be able to think about several things at once. (Obviously, a group that divides itself into "specialists" may have more luck with this sort of planning than students working alone would have.)

5. Finding Out about the Existing System: Students can work on plans for a community health maintenance system without knowing much about the existing health system in their community; later, they can do research to find out whether their plan is needed. However, some or all students may prefer to find out more about the existing system. Students who wish to do that should be encouraged to identify a part of the existing system that they want to know about, because they will not have time in this unit to learn much about the system as a whole. Students who want to research the existing health system in the community will be able to do concrete research on it in the following six lessons. In these two lessons they should talk (and write) about which aspect(s) of it they want to know more about, and why. As soon as they have got that settled, they should be allowed to begin designing their research (lessons 40-45).

B. Styles of Work:

1. Individual Students: Students who want to work alone might spend the first of these two class periods writing an outline or rough draft of their plans for all or part of a community health maintenance system, including arguments justifying the implementation of their plans. You might collect these at the end of the hour, read

them overnight and suggest improvements, and return them at the beginning of the second class period. These students could then spend the second class period improving or expanding on the plans they drew up during the first, and then turn in their revised plans at the end of the second period.

You might evaluate the first attempts on any or all of the following grounds: (1) susceptibility of the plan to research in the next six lessons, (2) appropriateness of the plan to the students' own community and (3) logical coherence of the plan and the reasons given to justify it.

2. Groups of Students: A group of students working together should spend part or all of the first class period agreeing explicitly on what the group is working on. Also during the first class period, the group should assign jobs to members, to be completed as a homework assignment before the second class meeting. The group can then spend the second class meeting combining the results of their individual work and drawing up an agreed-on plan (or part of a plan). The group plan could be turned in at the end of the second period.

3. The Class as a Whole: If the class works as a whole on a plan or part of a plan, then the first class period might be spent developing a detailed description of the problem the class is working on; students might write suggested solutions as a homework assignment; and the class as a whole might hear suggestions and try to reach consensus on a solution during the second class period. The answer should consist either of a relativley abstract scheme for organizing a whole community health maintenance system or of more concrete and detailed plans for one or more components of the system--depending on what sort of interests the class started out with. The plan should be reduced to writing, either by you on the chalkboard or by one or more recorders on paper, before the end of the second class period. If the class works as a whole, we recommend that you ask one or more students to conduct the discussion while you serve as observer and recorder.

ASSIGNMENT:

There is no assignment after the second of these two class sessions.

LESSONS 40 through 45: RESEARCH ON COMMUNITY HEALTH MAINTENANCE SYSTEMS

SYNOPSIS:

In these six lessons students design research projects based on their suggestions for a community health maintenance system, carry out the projects they have designed, report their findings to the class and discuss the results of the class' work. As a homework assignment at the end of this sequence students write in response to an interdisciplinary review assignment. (See Advance Preparations, below.)

OBJECTIVES:

The student will derive a research question from a student-generated plan for a community health maintenance system.

The student will select a method of inquiry appropriate to a student-generated research question.

The student, individually or as part of a group, will complete a student-designed research project.

The student will describe the research project he has worked on and the results of the research.

ADVANCE PREPARATIONS:

Following this sequence of lessons there remains in this unit only one lesson, which has been set aside for review of the unit. We strongly recommend that, between the beginning and the end of the present sequence of lessons, you get together with the other two Biomedical instructors and prepare one or more interdisciplinary review problems for use at the end of the unit.

Review problems might take any of several forms. Perhaps the most interesting to work with would be a fictional case history or a series of fictional case histories. Another possibility is, of course, a real case history based on current events. Regardless of the form of the problem, however, it should require that students apply concepts and skills from both Biomedical Social Science and Biomedical Science, and, if possible, from Biomedical Mathematics as well.

As far as Social Science is concerned, the review problems should give students the opportunity to think about all the major concepts and methods introduced in this unit: levels of analysis, dimensions of health, points of view and methods of inquiry. From the viewpoint of Science, the review problems should relate to respiratory disease, air pollution or both; it could be based on the "Tommy" stories, the fictional case history used in Unit I of Science.

These problems may be used in several ways. For example, they can be given to students a few days in advance of the last lesson as a written, take-home, test. If writing is difficult for some students or if for other reasons an oral report is preferred, groups of student can be assigned or can select problems that they will jointly investigate. The results of their investigations can be presented to the class. There are other means to accomplish the purpose of this interdisciplinary review. No matter which method you and your colleagues select, the main criterion should be, "Will the student be able to discover applications of knowledge and skills from all three (or two of the three) subjects he or she has studied which assist in the understanding of a problem area?"

Students' work on interdisciplinary review problems might be discussed in the three Biomedical classes separately, or it might serve as the basis of a meeting all three Biomedical instructors attend. In addition, the students' written work should be read and commented on by all three Biomedical instructors.

SUGGESTED TEACHING PROCEDURES:

Your experience in teaching the sequence on air pollution (lessons 28-33) should have given you some idea of what will work and what won't in this sequence. The following consists primarily of suggestions prompted by the difference between this research sequence and the one on air pollution.

A. Designing Projects: Students should begin, working individually or in groups, by designing projects. If students worked individually in the last two lessons, they should start this sequence working individually; if they worked in groups, they should start off working in the same groups; if they worked as a class, they might begi by working individually or in small groups and then reporting to the class, or they might work as a class from the outset.

The students' most difficult problems in completing this initial task will be to define questions narrow enough to be answered via the simple research methods they have studied, and to select methods of inquiry appropriate to their questions. (The Background Informatio section following these Suggested Teaching Procedures indicates the range of research activities students might carry out.)

The following sequence of activities is suggested as one (but not the only one) organization for producing good research designs.

1. Formulate a Question: Working individually, in groups or as a class, as described above, students formulate questions based directly on their suggestions for a community health maintenance system. Questions should be directed toward finding out something about the community's existing health system or toward finding out other people's responses to the students' suggestions for a community health maintenance system.

2. Select a Method of Inquiry: Working in the same configurations as before, students select the methods of inquiry most appropriate to their questions.

3. Design a Research Project: Still working in the same configurations, students design the details of their research projects, perhaps narrowing down their questions as necessary to make the projects practical.

4. Get Feedback and Reorganize: At this point you can review all project proposals, suggest improvements and, if necessary, reorganize the class. Reorganization is advisable (1) if some individuals or groups have been unable to produce acceptable proposals; (2) if some individuals or groups have produced proposals that they will not be able to complete without more students to help them or (3) if the class as a whole or any group within the class finds itself divided over what is the best research project to undertake.

5. Rewrite Proposals and Get Final Approval: The reorganized class revises proposals as you think necessary and gets your approval.

6. Assign Tasks to Individual Students: Students who have been working alone and want to complete their projects alone submit timetables for completing their projects. Each group (or the class if it is working as a whole) submits a statement about what each member is going to do as well as a timetable according to which he will be expected to do it.

All these planning stages might be expected to take at least two class periods and possibly longer. When these preparations are completed you and the class should agree on a schedule for the remaining lessons in this sequence. Individuals' and groups' timetables should be adjusted as necessary to ensure that there will be enough time left at the end of the sequence for reports and for class discussion of the whole sequence.

B. Doing the Research: Your previous experiences with the class will be your best guide in this part of the activity. Classroom time should be scheduled to enable the whole class to observe role-playing activities and laboratory experiments (if subjects can be drawn from the faculty or student body of the school) and to participate in simulation games. Students using book research and data manipulation may be able to work in the classroom or in the library during class time. Students designing survey questionnaires or lists of questions for unstructured interviews should have the opportunity to work in the classroom with your guidance. Students whose projects don't take long to complete might be asked to report early, revise their questions or research designs and then do some follow-up work.

C. Reports: As in the sequence on air pollution, written reports should be reproduced and distributed to the class if you have the necessary facilities. Classroom time should be scheduled so as to allow the class to hear (or see) all reports and to question the researchers who present them. You might require some note-taking during the reporting period, directing students to note one or more of the following: (1) information about the existing health maintenance system in the community, (2) changes in the existing health maintenance system which students have proposed, (3) information about the reactions of others to the students' proposals and (4) impressions about the usefulness of the various methods of inquiry for studying health care on the community level of analysis.

D. Discussion: When all reports have been given, the class should discuss all of the four topics listed in Part C above: what the class has learned about existing health care in the community, what changes class members have recommended, what others in the community think about the class' recommendations and what the class thinks about the various methods of inquiry they have used, as tools for investigating health problems in the community.

ASSIGNMENT:

The final lesson of this unit has been set aside for review of the unit. One method of review is the use of interdisciplinary review problems as described in the Advance Preparations section preceding the Suggested Teaching Procedures for the present sequence of lessons.

An alternative method of review is to assign one or more writing topics related to the levels of analysis on which health problems can be studied, the dimensions of health that can be considered, the points of view from which health problems can be approached and the methods of inquiry that can be used to study these problems. Students' work on such a written assignment can be discussed during the final lesson of the unit.

BACKGROUND INFORMATION:

The following consists of a partial list of things that students might inquire into during Lessons 40-45. This list is intended to indicate the range of things that students might do. Students should be encouraged to design their own inquiries to match their own ideas for a community health maintenance system. The ideas below are organized according to the methods of inquiry students might use.

A. Participant Observation: Students might visit existing health facilities in the community as real patients. They might go to doctors' or dentists' offices, clinics or hospitals for checkups. As participants in these health care delivery situations they might observe such things as the behavior of health workers toward patients and clients, the interactions among health workers or the behavior or opinions of clients in waiting rooms. What is to be observed depends, of course, on what aspect of the community health maintenance system students are interested in.

B. Questionnaire Survey: Students might design and administer a questionnaire to a sample drawn from any of several populations: members of the community in general, members of some group within the community (old people, young people, women, men, members of a racial or ethnic group, old women members of an ethnic group, young men members of an ethnic group, etc.), public officials in local government, community health workers in general or workers in a particular health career. Respondents could be asked for opinions about the existing health system in the community or about students' suggestions for a health maintenance system. (Is what the students suggest needed? Is it possible? What good would it do? What harm would it do?)

C. Role-Playing: Students could design and conduct role-playing activities to investigate relationships among health workers or relationships between health workers and clients. For example, if students have suggested the introduction of outreach workers to scour the community for people with some particular health problem and to get them in for treatment, then a two-stage role-playing activity could be used; in the first stage "clients" could confront existing "health workers" without the help of an outreach worker, and in the second stage an "outreach worker" could intermediate between "clients" and "health workers." Those who have played the roles and those who have observed could then generalize about the differences in participants' perceptions and in their behavior from one stage to the other.

D. Book Research: Students might research local,state or federal laws relevant to any sort of health maintenance program they have suggested. They might also research any written materials distributed by local health organizations (public health department, sanitation department, publicly funded clinics, etc.) or by local voluntary groups interested in health maintenance (TB and Respiratory Disease Association, Heart Fund, Red Cross, etc.). Either kind of research should of course be preceded by a carefully detailed description of what it is the students are trying to find out.

E. Unstructured Interview: Students could use unstructured interviews in all the same sorts of situations they could use questionnaire research in; a group of students or the whole class might use both methods simultaneously to investigate the same question.

F. Data Manipulation: Students could seek data on health in the community from local health organizations (public health department, etc.) and use it to get information about the degree of need for the health maintenance program the students have proposed. (One possible finding from such research which would be interesting and informative is that the data are not available--if people want to think about new programs they often have to start by gathering their own information about the existing situation.)

G. Field Manipulation and Observation: Students might use this method to find out something about how the existing health maintenance system in the community works, particularly to verify their own existing impressions that the existing system does not provide care for people in some category (people with VD, poor people, members of some racial or ethnic troup, people who want abortions, people who want birth control information, etc.). Student projects of this kind should not be undertaken lightly or without adult supervision. Because of the element of deception involved, such projects may be hazardous to your political health.

H. *Nonparticipant Observation*: Students might be able to get themselves invited to observe work going on in existing health care delivery situations in the community. As nonparticipant observers they could observe essentially any aspect of local health care delivery that the big people will let them watch. Nonparticipant observation might also be used in meetings of local governing bodies (city council, board of supervisors, etc.) which happen to be discussing issues related to health care delivery in the community.

I. *Laboratory Experiment*: Students might be able to devise laboratory experiments to investigate people's responses to different sorts of situations. For example, students may be interested in some psychological question such as, "Are patients more likely to talk freely if health workers speak in the patients' own jargon (slang, dialect, language) than if the workers speak in technical English?" An experiment to answer this question would involve a series of interviews in which interviewers speak in the jargon (slang, etc.) of the people being interviewed, and another series of interviews in which the interviewers use technical English. The content of the interviews might have to do with the interviewees' health histories, their experiences with the community's health maintenance system, etc.; the content should not be something that interviewees are likely to find threatening in itself no matter what language is used, such as sex. The two sets of interviewees should be as closely matched as possible, and the interviewers should be prepared to keep track of what the interviewees say and also to note signs of discomfort, anxiety, unhappiness, etc.

J. *Model-Building*: Students might design simulations to represent either the way they think the existing community health system works, the way they have found it to work through their own observations (e.g., through interviews with health workers) or the way they think it *should* work. If they do the first, they should follow it up with some investigation of the real situation and then revise their simulation to reflect their findings.

LESSON 46: REVIEW

SYNOPSIS:

In this lesson students discuss the interdisciplinary review assignment given in the preceding lesson.

OBJECTIVES:

Given a real or fictional health problem, the student will:

1. identify and describe at least one level of analysis, one dimension of health, one point of view and one method of inquiry applicable to the problem;

2. apply to the same problem appropriate natural-science skills, concepts and information.

3. apply to the same problem appropriate mathematical skills and concepts.

SUGGESTED TEACHING PROCEDURES:

The format and content of the discussion will depend on the nature of the interdisciplinary problem(s) you have assigned. The Background Information section following these Suggested Teaching Procedures consists of an outline of the concepts and methods introduced in Unit I of Biomedical Social Science. In general, students should be able to describe the relationship of each of these concepts and methods to the problem assigned.

Although this is the last lesson of Unit I and no later lessons are set aside for discussion of this review problem, we strongly recommend that you and the other Biomedical instructors use criterion-referenced evaluation in responding to students' work, and provide students with the opportunity to improve on their work.

ASSIGNMENT:

There is no assignment.

BACKGROUND INFORMATION:

The following is an outline of the concepts and methods introduced in Unit I of Biomedical Social Science.

A. Levels of an Analysis:

1. Individual.

2. Family.

3. Community.

4. Society.

B. Dimensions of Health:

1. Opinions, attitudes and beliefs.

2. Roles and relationships (healers, patients, family members, others).

3. Technology (tools, instruments, drugs, methods).

4. Causation, prevention, detection and treatment of disease.

C. Points of View:

1. Distribution of resources (economics).
2. Allocation of responsibility (political science).
3. Institutions and institutional patterns of behavior (sociology).
    a. Family.
    b. Education.
    c. Religion.
    d. Economy.
    e. Polity (government).
4. Shared ideas and traditions (cultural anthropology).
5. Thinking, emotion and motivation (psychology).
6. Values (ethics).
7. Interaction with environments (ecology).

D. Methods of Inquiry:

1. Participant observation.
2. Questionnaire survey.
3. Role-playing.
4. Book research.
5. Unstructured interview.
6. Data manipulation.
7. Field manipulation and observation.
8. Nonparticipant observation.
9. Laboratory experiment.
10. Model-building (use of simulation games).

APPENDIX: INFORMATION ON HEALTH CAREERS

In lessons 12-15 of this unit your students will need access to information about a wide variety of health careers. A most important source of information of this kind is the variety of pamphlets and handbooks that professional associations, state health manpower programs and other organizations use for the purpose of recruiting new health workers.

The Advance Preparations section of lessons 12-15 (immediately preceding the Suggested Teaching Procedures for those lessons) lists two very useful resources, one published by the AMA and the other by the federal government. At your earliest opportunity you should check to see whether these are available from your school district or from a local library; if not, you should send for the books. They will be invaluable in the classroom.

In addition to those two books there are numerous publications of narrower scope. Several sources of such publications are listed in this appendix. You should try to get as much information from these sources as possible.

Information on Particular Careers: Below is a list of national professional associations and other organizations which publish information about particular health careers or clusters of careers.

On General Medical Practice:

American Academy of Family Physicians
Volker Boulevard at Brookside
Kansas City, Missouri 64112

On Specialty Branches of Medicine:

Anesthesiology

American Society of Anesthesiologists
515 Busse Highway
Park Ridge, Illinois 60068

Internal Medicine

American Society of Internal Medicine
525 The Hearst Bldg.
3rd at Market Street
San Francisco, California 94103

Obstetrics and Gynecology

American College of Obstetricians & Gynecologists
79 West Monroe Street
Chicago, Illinois 60603

Ophthalmology

American Association of Ophthalmology
1100-17th Street, N.W.
Washington, D.C. 20036

Orthopedic Surgery

American Academy of Orthopedic Surgeons
430 N. Michigan Ave.
Chicago, Illinois 60611

Pathology

College of American Pathologists
230 N. Michigan Ave.
Chicago, Illinois 60601

Pediatrics

American Academy of Pediatrics
1801 Hinman Avenue
Evanston, Illinois 60204

Psychiatry

American Psychiatric Association
1700 Eighteenth St., N.W.
Washington, D.c. 20009

Radiology

American College of Radiology
20 North Wacker Drive
Chicago, Illinois 60606

Surgery

American College of Surgeons
55 East Erie Street
Chicago, Illinois 60611

On Physical Therapy:

The American Physical Therapy Association
1740 Broadway
New York, New York 10019

On Occupational Therapy:

The American Occupational Therapy Association
251 Park Avenue South
New York, New York 10010

On Recreation Therapy:

Consulting Service on Recreation for the Ill and Handicapped
National Recreation and Park Association
1700 Pennsylvania Avenue, N.W.
Washington, D.C. 20006

On Rehabilitation Careers (All Levels):

American Scholarship Association
225 Park Avenue South
New York, New York 10003

On Speech Pathology and Audiology:

The American Speech and Hearing Association
9030 Old Georgetown Road
Washington, D.C. 20014

On Medical and Psychiatric Social Work:

National Association of Social Workers
2 Park Avenue
New York, New York 10016

On Medical Technology:

The Registry of Medical Technologists
710 South Wolcott Avenue
Chicago, Illinois 60612

American Society of Medical Technologists
645 N. Michigan
Chicago, Illinois 60611

On Professional Nursing:

ANA-NLN Nursing Careers Program
American Nurses Association
10 Columbus Circle
New York, New York 10019

Committee on Nursing
American Medical Association
535 North Dearborn
Chicago, Illinois 60610

On Practical Nursing:

ANA-NLN Nursing Careers Program
American Nurses Association
10 Columbus Circle
New York, New York 10019

National Association for Practical Nurse Education and Service
535 Fifth Avenue
New York, New York 10017

National Federation of Licensed Practical Nurses, Inc.
250 West 57th Street
New York, New York 10019

Committee on Nursing
American Medical Association
535 North Dearborn
Chicago, Illinois 60610

On Nurse Anesthetists:

American Association of Nurse Anesthetists
Suite 3010, Prudential Plaza
Chicago, Illinois 60601

On Nursing Careers with the Veterans Administration:

Department of Medicine and Surgery
Veterans Administration
Washington, D.C. 20420

On Auxiliary Nursing Careers:

American Hospital Association
840 North Lake Shore Drive
Chicago, Illinois 60611

On Hospital Administration:

American College of Hospital Administrators
840 North Lake Shore Drive
Chicago, Illinois 60611

Association of University Programs in Hospital Administration
1642 East 56th Street
Chicago, Illinois 60637

On Hospital Pharmacy:

The American Society of Hospital Pharmacists
4630 Montgomery Avenue
Washington, D.C. 20014

On Inhalation Therapy:

American Association for Inhalation Therapy
Suite 316, 4075 Main Street
Riverside, California 92501

On Medical Record Library Science Careers:

American Medical Record Association
211 East Chicago Avenue
Chicago, Illinois 60611

On Operating Room Nurses:

Association of Operating Room Nurses
8085 East Prentice
Englewood, Colorado 80110

On Other Career Opportunities in Hospitals:

The American Hospital Association
840 North Lake Shore Drive
Chicago, Illinois 60611

On Dietetics and Nutrition:

The American Dietetic Association
620 North Michigan Avenue
Chicago, Illinois 60611

American Home Economics Association
1600 Twentieth Street, N.W.
Washington, D.C. 20009

On Medical Assisting (Office Work):

American Association of Medical Assistants
200 East Ohio Street
Chicago, Illinois 60611

On the Biological and Other Life Sciences
(Health Related Careers):

American Chemical Society
1155 Sixteenth Street, N.W.
Washington, D.C. 20006

American Institute of Biological Sciences
3900 Wisonsin Avenue, N.W.
Washington, D.C. 20418

American Physiological Society
9650 Rockville Pike
Bethesda, Maryland 20014

American Society of Biological Chemists
9650 Rockville Pike
Bethesda, Maryland 20014

On Clinical Psychology:

American Psychological Association
1200 Seventh Street, N.W.
Washington, D.C. 20036

On Dentistry:

American Dental Association
211 East Chicago Avenue
Chicago, Illinois 60611

American Association of Dental Schools
211 East Chicago Avenue
Chicago, Illinois 60611

American Dental Assistants Association
211 East Chicago Avenue
Chicago, Illinois 60611

American Dental Hygienists Association
211 East Chicago Avenue
Chicago, Illinois 60611

On the Environmental Health Field:

National Association of Sanitarians
University of Denver
Denver, Colorado 80216

American Industrial Hygiene Association
14125 Prevost Street
Detroit, Michigan 48227

Water Pollution Control Federation
3900 Wisconsin Avenue
Washington, D.C. 20016

American Society of Safety Engineers
5 North Wabash Avenue
Chicago, Illinois 60602

American Hospital Association
(Hospital Engineers)
840 North Lake Shore Drive
Chicago, Illinois 60611

American Chemical Society
(Chemical Engineering)
1155 Sixteenth Street, N.W.
Washington, D.C. 20006

On Health Careers in the Armed Forces:

Medical and Health
Department of Defense
Washington, D.C. 20025

On Health Education:

American Association for Health, Physical Education
and Recreation
1201 Sixteenth Street, N.W.
Washington, D.C. 20036

National Tuberculosis Association
1740 Broadway
New York, New York 10019

Society of Public Health Educators, Inc.
(Health Education as a Profession)
419 Park Avenue South
New York, New York 10016

On Health Research:

American Cancer Society
(Medical Research)
219 East 42nd Street
New York, New York 10017

American Heart Association
(Medical Research)
44 East 23rd Street
New York, New York 10010

American Society of Biological Chemists
(Biochemical Research)
9650 Wisconsin Avenue
Washington, D.C. 20014

U.S. Public Health Service (Research Specialties Involving
the Health Professions and Health Sciences)
Public Inquiries Branch
Office of Information
Washington, D.C. 20025

National Health Council
1740 Broadway
New York, New York 10019

On Medical Illustration:

Corresponding Secretary
Association of Medical Illustrators
738 Keystone Avenue
River Forest, Illinois 60305

On Medical Librarians:

Medical Library Association
Palmolive Building
919 North Michigan Avenue
Chicago, Illinois 60611

On Medical Record Librarians:

American Medical Record Association
211 East Chicago Avenue
Chicago, Illinois 60611

On the Mental Health Field:

American Psychiatric Association
1700 Eighteenth Street, N.W.
Washington, D.C. 20009

The National Association for Mental Health
10 Columbus Circle
New York, New York 10019

On Orthoptics (Science Dealing with Eye Coordination)

The American Orthoptic Council
3400 Massachusetts Avenue, N.W.
Washington, D.C. 20007

On Orthotics and Prosthetics (Design and Fitting of Artificial Limbs and Braces):

American Orthotics and Prosthetics Association
919 Eighteenth St., N.W.
Washington, D.C. 20006

On Pharmacy:

American Pharmaceutical Association
2215 Constitution Avenue, N.W.
Washington, D.C. 20037

On Public Health:

American Public Health Association
1740 Broadway
New York, New York 10019

U.S. Public Health Service
Public Inquiries Branch
Office of Information
Washington, D.C. 20025

On Rehabilitation Counseling:

Department of Health, Education and Welfare
Vocational Rehabilitation Administration
Washington, D.C. 20201

National Society for Crippled Children and Adults
2023 West Ogden Avenue
Chicago, Illinois 60612

United Cerebral Palsy Association
321 West 44 Street
New York, New York 10036

On Veterinary Medicine:

American Veterinary Medical Association
600 South Michigan Avenue
Chicago, Illinois 60605

Information on Careers in Particular States: At this writing, 26 states have health manpower programs and similar organizations which publish information about health career opportunities in their own states and metropolitan areas. These establishments are listed below. If your state is not represented, contact organizations in one or more states near you. Health careers are largely uniform across the country, although opportunities may vary from one region to another.

Alabama

Health Careers Council of Alabama
901 South 18th Street
Birmingham, Alabama 35205

Arizona

Arizona Hospital Association
635 West Indian School Road
Phoenix, Arizona 85013

California

Health Manpower Council of California
2615 East Clinton Avenue
Fresno, California 93703

Hospital Council of Southern California
6255 Sunset Boulevard, Suite 817
Los Angeles, California 90027

Health Careers Program, Los Angeles
National Medical Association Foundation
1635 East 103rd Street, Suite 201
Los Angeles, California 90002

Colorado

Colorado Health Careers Council
1809 East 18th Avenue
Denver, Colorado 80218

Connecticut

Connecticut Institute for Health Manpower Resources, Inc.
770 Asylum Avenue
Hartford, Connecticut 06105

Florida

South Florida Hospital Association
2 Coral Way
Miami, Florida 33131

Georgia

Georgia Higher Education Assistance Corporation
State Scholarship Commision
703 Trinity-Washington Building
Atlanta, Georgia 30334

Northwest Georgia Regional Advisory Council, Inc.
8 North Tennessee Street
Cartersville, Georgia

Idaho

Idaho Health Careers Recruitment Council
P.O. Box 7482
Boise, Idaho 83707

Indiana

Indiana Health Careers, Inc.
29 North Meridian Street
Indianapolis, Indiana 46208

Kentucky

Health Careers in Kentucky
P.O. Box 4162
Louisville, Kentucky 40204

Maine

Health Council of Maine
133 State Street
Augusta, Maine 04330

Minnesota

Minnesota Health Careers Council
2333 University Avenue, S.E.
Minneapolis, Minnesota 55414

New Hampshire

New Hampshire Health Careers Council
61 South Spring Street
Concord, New Hampshire 03301

New Jersey

New Jersey Health Careers Service
375 West State Street
Trenton, New Jersey 08618

Hospital Research Education Trust of New Jersey
Careers in Health Mobile Unit Program
1101 State Road
Princeton, New Jersey 08540

New York

Health Career Information and Referral Service
New York State Department of Health
84 Holland Avenue
Albany, New York 12208

United Health Foundation of Western New York, Inc.
220 Delaware Avenue
Buffalo, New York 14202

United Hospital Fund of New York
3 East 54th Street
New York, New York 10022

Western New York Hospital Association
2005 Sheridan Drive
Buffalo, New York 14223

North Carolina

North Carolina Hospital Association
Health Careers Program
P.O. Box 10937
Raleigh, North Carolina 27605

North Dakota

North Dakota Health Careers Council
Box 1442
Bismarck, North Dakota 58501

Ohio

Health Careers Association of Greater Cincinnati
2400 Reading Road
Cincinnati, Ohio 45202

Greater Cleveland Hospital Association
1001 Huron Road
Cleveland, Ohio 44115

Health Careers of Ohio
P.O. Box 5574
Columbus, Ohio 43221

Oklahoma

Oklahoma Council for Health Careers
836 N.E. 15th Street
Oklahoma City, Oklahoma 73190

Oregon

Woman's Auxiliary of the Oregon Medical Association
2164 Southwest Park Place
Portland, Oregon 97205

Pennsylvania

The Hospital Association of Pennsylvania
1200 Camp Hill Bypass
P.O. Box 608
Camp Hill, Pennsylvania 17011

South Carolina

South Carolina Appalachian Regional Health Policy and Planning Council
P.O. Box 6708, Station B
Greenville, South Carolina 29606

Tennessee

Tennessee Health Careers Program
210 Reidhurst Avenue
Nashville, Tennessee 37203

Texas

Texas Health Careers Program
Texas Hospital Association
P.O. Box 4553
Austin, Texas 78765

Virginia

Virginia Health Careers
Virginia Council on Health and Medical Care
Box 12363, Central Station
Richmond, Virginia 23241

Wisconsin

Health Careers Program
Wisconsin Health Council, Inc.
Wisconsin Hospital Association
P.O. Box 4387
Madison, Wisconsin 53711

Hospital Council of Greater Milwaukee Area
9800 West Bluemound Road
Milwaukee, Wisconsin 53226

Information on Recent Publications: Below are listed two publications, both produced by the National Health Council and both revised annually. These are excellent sources of information about information; they list the latest publications available on health careers.

Health Careers Publications Guide

This Guide lists both national and state and local organizations and gives brief descriptions of their current publications.

Where To Get Health Career Information

This pamphlet lists organizations to contact for further information on health careers, educational requirements, financial aid and employment outlook.

Both these publications are available from:

National Health Council, Inc.
1740 Broadway
New York, New York 10019